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**AEROSPACE MEDICINE
AND BIOLOGY**

A CONTINUING BIBLIOGRAPHY

WITH INDEXES

(Supplement 110)

JANUARY 1973

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

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AEROSPACE MEDICINE AND BIOLOGY

A CONTINUING BIBLIOGRAPHY WITH INDEXES

(Supplement 110)

A selection of annotated references to unclassified reports and journal articles that were introduced into the NASA scientific and technical information system and announced in December 1972 in

- *Scientific and Technical Aerospace Reports (STAR)*
- *International Aerospace Abstracts (IAA)*



Scientific and Technical Information Office
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
JANUARY 1973
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INTRODUCTION

This Supplement of *Aerospace Medicine and Biology* (NASA SP-7011) lists 314 reports, articles and other documents announced during December 1972 in *Scientific and Technical Aerospace Reports (STAR)* or in *International Aerospace Abstracts (IAA)*. The first issue of the bibliography was published in July 1964; since that time, monthly supplements have been issued.

In its subject coverage, *Aerospace Medicine and Biology* concentrates on the biological, physiological, psychological, and environmental effects to which man is subjected during and following simulated or actual flight in the earth's atmosphere or in interplanetary space. References describing similar effects of biological organisms of lower order are also included. Such related topics as sanitary problems, pharmacology, toxicology, safety and survival, life support systems, exobiology, and personnel factors receive appropriate attention. In general, emphasis is placed on applied research, but references to fundamental studies and theoretical principles related to experimental development also qualify for inclusion.

Each entry in the bibliography consists of a bibliographic citation accompanied in most cases by an abstract. The listing of the entries is arranged in two major sections: *IAA Entries* and *STAR Entries*, in that order. The citations, and abstracts when available, are reproduced exactly as they appeared originally in *IAA* or *STAR*, including the original accession numbers from the respective announcement journals. This procedure, which saves time and money, accounts for the slight variation in citation appearances.

Two indexes—subject and personal author—are included.

An annual index will be prepared at the end of the calendar year covering all documents listed in the 1972 Supplements.

AVAILABILITY OF CITED PUBLICATIONS

IAA ENTRIES (A72-10000 Series)

All publications abstracted in this Section are available from the Technical Information Service, American Institute of Aeronautics and Astronautics, Inc. (AIAA), as follows: Paper copies are available at \$5.00 per document up to a maximum of 20 pages. The charge for each additional page is 25 cents. Microfiche ⁽¹⁾ are available at the rate of \$1.00 per microfiche for documents identified by the # symbol following the accession number. A number of publications, because of their special characteristics, are available only for reference in the AIAA Technical Information Service Library. Minimum airmail postage to foreign countries is \$1.00. Please refer to the accession number, e.g., A72-10613, when requesting publications.

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All publications abstracted in this bibliography are available to the public through the sources as indicated in the *STAR Entries* and *IAA Entries* sections. It is suggested that the bibliography user contact his own library or other local libraries prior to ordering any publication inasmuch as many of the documents have been widely distributed by the issuing agencies, especially NASA. A listing of public collections of NASA documents is included on the inside back cover.

SUBSCRIPTION AVAILABILITY

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TYPICAL CITATION AND ABSTRACT FROM STAR

NASA SPONSORED DOCUMENT		AVAILABLE ON MICROFICHE
NASA ACCESSION NUMBER	N72-10072*#	CORPORATE SOURCE
TITLE	Scientific Translation Service, Santa Barbara, Calif.	
AUTHOR	FURTHER STUDIES ON THE RELATION BETWEEN MITOCHONDRIA AND GLYCOLYSIS [WEITERE UNTERSUCHUNGEN UEBER DIE BEZICHUNG ZWISCHEN MITOCHONDRIEN UND GLYKOLYSE]	PUBLICATION DATE
CONTRACT OR GRANT	E. J. Schneider, A. Graffi, H. Bielka, and L. Venker Washington NASA Nov. 1971 4 p refs Transl. into ENGLISH from Naturwissenschaften (W. Berlin), v. 44, 1957 p 446 (Contract NASw-2035)	AVAILABILITY SOURCE
REPORT NUMBER	(NASA-TT-F-14034) Avail: NTIS CSCL ORE	COSATI CODE
	The relation between mitochondria and glycolysis is studied. It is found that mitochondria influences glycolysis even when glucose alone is used as the substrate, and not combined with HDP.	

TYPICAL CITATION AND ABSTRACT FROM IAA

NASA SPONSORSHIP		
AIAA ACCESSION NUMBER	A72-10818 *	AUTHORS
TITLE	Foundations of planetary quarantine. L. B. Hall (NASA, Washington, D.C.) and R. G. Lyle (Exotech Systems, Inc., Washington, D.C.) (Environmental Biology and Medicine, vol. 1, 1971, p. 5-8.) In: Planetary quarantine: Principles, methods, and problems. (A72-10817 01-05) New York, Gordon and Breach, Science Publishers, Inc., 1971, p. 5-8. 10 refs. Contract No. NSR-09-010-027.	AUTHORS' AFFILIATION
TITLE OF PERIODICAL	Discussion of some of the problems in microbiology and engineering involved in the implementation of planetary quarantine. It is shown that the solutions require new knowledge in both disciplines for success at low cost in terms of both monetary outlay and man's further exploration of the planets. A related problem exists in that engineers are not accustomed to the wide variation of biological data and microbiologists must learn to work and think in more exact terms. Those responsible for formulating or influencing national and international policies must walk a tightrope with delicate balance between unnecessarily stringent requirements for planetary quarantine on the one hand and prevention of contamination on the other. The success of planetary quarantine measures can be assured only by rigorous measures, each checked, rechecked, and triple-checked to make sure that no errors have been made and that no factor has been overlooked.	PUBLICATION DATE
	M.V.E.	CONTRACT, GRANT, OR SPONSORSHIP



AEROSPACE MEDICINE AND BIOLOGY

A Continuing Bibliography (Suppl. 110)

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IAA ENTRIES

A72-43347 # Simultaneous neutron-activation analyses of scandium, cobalt, iron, and zinc in biological objects with the aid of a total-absorption gamma spectrometer (Odnovremennoe neitronno-aktivatsionnoe opredelenie skandiia, kobal'ta, zheleza i tsinka v biologicheskikh ob'ektakh s pomoshch'iu gamma-spektrometra polnogo pogloshcheniia). Sh. Khatamov, A. A. Kist, and U. Maksudov (Akademiia Nauk Uzbekskoi SSR, Institut Iadernoi Fiziki, Tashkent, Uzbek SSR). *Akademiia Nauk Uzbekskoi SSR, Izvestiia, Seriia Fiziko-Matematicheskikh Nauk*, vol. 16, no. 3, 1972, p. 68-71. 7 refs. In Russian.

A72-43381 Life sciences and space research X; Proceedings of the Fourteenth Plenary Meeting, Seattle, Wash., June 21-July 2, 1971. Meeting sponsored by COSPAR. Edited by W. Vishniac (Rochester, University, Rochester, N.Y.). Berlin, East Germany, Akademie-Verlag, 1972. 238 p. \$22.50.

The papers review the development of planetary quarantine in the U.S., reevaluate material effects on microbial release from solids, and consider the effects of aeolian erosion on microbial release from solids. The reactions of primates to the effects of weightlessness and results of various flight experiments are discussed. Attention is given to the effects of chronic irradiation and of space on living matter, and preparations for the exploration of Mars are discussed.

F.R.L.

A72-43382 * # Development of planetary quarantine in the United States. D. G. Fox, L. B. Hall (NASA, Planetary Quarantine Office, Washington, D.C.), and E. J. Bacon (Exotech Systems, Inc., Washington, D.C.). In: Life sciences and space research X; Proceedings of the Fourteenth Plenary Meeting, Seattle, Wash., June 21-July 2, 1971. Berlin, East Germany, Akademie-Verlag, 1972, p. 1-9. 16 refs.

This paper traces the development of the United States Planetary Quarantine Program, with emphasis on progress during the past four years. The NASA Planetary Quarantine Program closely follows policies recommended by the ICSU, COSPAR and the United States National Academy of Sciences Space Science Board. Policy formulation, program planning, and implementation follow an orderly process recommended by a Planetary Quarantine Advisory Panel and other related groups. In fulfilling its obligations, the Planetary Quarantine Office guides and supports quarantine activities within United States planetary flight projects and certifies projects

for launch. The paper uses ongoing flight programs to illustrate the role of the NASA Planetary Quarantine Program in assuring the biological integrity of the planets. (Author)

A72-43383 * # A re-evaluation of material effects on microbial release from solids. D. M. Taylor, R. H. Green (California Institute of Technology, Jet Propulsion Laboratory, Pasadena, Calif.), S. J. Fraser, E. A. Gustan, R. L. Olson (Boeing Co., Seattle, Wash.). In: Life sciences and space research X; Proceedings of the Fourteenth Plenary Meeting, Seattle, Wash., June 21-July 2, 1971. Berlin, East Germany, Akademie-Verlag, 1972, p. 23-28. Contracts No. JPL-952511; No. JPL-952916.

Studies were conducted to obtain information on the release of micro-organisms from different solid materials impacted onto two types of surfaces. The combined study was performed by inoculating 10,000 *Bacillus subtilis* var. niger spores into Eccobond and methyl methacrylate. These materials were then machined into projectiles and fired from guns into stainless steel plates or sand at velocities ranging from 168 to 1554 m/sec. Bacteriological examination of the fractured particles was conducted to establish the number of viable spores released from the interior of the projectiles. Analysis of the results from two solid materials, two impact surfaces, and four velocities showed that the number of micro-organisms released is less than 1% in all cases. However, statistical evaluation of all data demonstrates a significant difference in percentage microbial release between materials. (Author)

A72-43384 * # Effects of aeolian erosion on microbial release from solids. E. A. Gustan, R. L. Olson (Boeing Co., Seattle, Wash.), D. M. Taylor, and R. H. Green (California Institute of Technology, Jet Propulsion Laboratory, Pasadena, Calif.). In: Life sciences and space research X; Proceedings of the Fourteenth Plenary Meeting, Seattle, Wash., June 21-July 2, 1971. Berlin, East Germany, Akademie-Verlag, 1972, p. 29-32. 8 refs. Contract No. JPL-952916.

This study was initiated to determine the percentage of spores that would be expected to be released from the interior of solid materials by aeolian erosion on a planetary surface. Methyl methacrylate and Eccobond disks were fabricated so that each disk contained approximately 40,000 *Bacillus subtilis* var. niger spores. The disks were placed in a specially designed sandblasting device and eroded. Exposure periods of 0.5, 2 and 24 hours were investigated using filtered air to accelerate the sand. A series of tests was also conducted for a 0.5 hour period using carbon dioxide. Examination of the erosion products showed that less than 1% of the spores originally contained in the solids was released by aeolian erosion. (Author)

A72-43385 * # Effects of weightlessness on astronauts - A summary. S. C. White, R. R. Hessberg (NASA, Office of Manned Spaceflight, Washington, D.C.), and C. A. Berry (NASA, Manned Spacecraft Center, Houston, Tex.). In: Life sciences and space research X; Proceedings of the Fourteenth Plenary Meeting, Seattle,

Wash., June 21-July 2, 1971. Berlin, East Germany, Akademie-Verlag, 1972, p. 47-55.

This paper reviews the adaptive changes observed in the United States astronauts during flight programs to this date. A series of postulates are offered as to what is happening in these adaptive events. A hypothesis is proposed as to the interrelationship of events observed in the body systems and functions involved. The importance of undertaking an extensive life sciences program, including an on-orbit phase of study as well as pre- and post-flight studies is discussed. Finally, the role the Skylab flight plays in the United States Space Program in achieving the future requirements for more extensive life sciences data is summarized. (Author)

A72-43386 # Effects of an 18-day flight on the human body. A. D. Egorov, L. I. Kakurin, and Iu. G. Nefedov (Institute of Medical and Biological Problems, Moscow, USSR). In: Life sciences and space research X; Proceedings of the Fourteenth Plenary Meeting, Seattle, Wash., June 21-July 2, 1971. Berlin, East Germany, Akademie-Verlag, 1972, p. 57-60.

During their flight on board the Soyuz 9, Nikolayev and Sevastyanov adapted to weightlessness by the 3rd-4th day and stabilized their physiological functions by the end of the mission. In contrast to the effects of shorter term flights, this mission caused unusual and distressing feelings in the crew members aggravated by distinct changes in the major physiological systems during the first day to recovery. In the immediate post-flight hours, the transition from the recumbent to the sitting position brought about circulation disorders; 24 hours later the cosmonauts still walked with uncertainty and kept the erect position at rest on account of a significant elevation of their centre of gravity. Weight losses, shifts of water and mineral metabolism, bone tissue demineralization and symptoms of orthostatic intolerance observed in this flight were similar to those resulting from earlier short-term missions. Of importance was a dysbacteriotic change in the skin and nasal microflora. (Author)

A72-43387 # Functional insufficiency of the neuromuscular system caused by weightlessness and hypokinesia. L. I. Kakurin, M. A. Cherepakhin, A. S. Ushakov, and Iu. A. Senkevich (Institute of Medical and Biological Problems, Moscow, USSR). In: Life sciences and space research X; Proceedings of the Fourteenth Plenary Meeting, Seattle, Wash., June 21-July 2, 1971. Berlin, East Germany, Akademie-Verlag, 1972, p. 61-64.

The results of study of the crew members of the spaceships Soyuz are described, and the effects of weightlessness on reflex excitability, muscular tone, and muscle contractibility are discussed. A certain decrease in postural muscular tone and strength, an increase in reflex excitability at rest, and an increase in bioelectric activity of muscles at work have been found in the cosmonauts after their stay in a weightless environment. The circumference of the lower extremities decreased. (Author)

A72-43388 # Studies on weightlessness in a primate in the Biosatellite 3 experiment. W. R. Adey (California, University, Los Angeles, Calif.). In: Life sciences and space research X; Proceedings of the Fourteenth Plenary Meeting, Seattle, Wash., June 21-July 2, 1971. Berlin, East Germany, Akademie-Verlag, 1972, p. 67-85. 35 refs.

In June 1969 a male *Macaca nemestrina* (pigtail macaque) was flown in earth orbit for 8.8 days in NASA Biosatellite 3. The experiment examined in detail central nervous and cardiovascular functions, and included pre- and post-flight whole body metabolic assessment, in-flight urine analysis, and pre- and post-flight bone density measurements. Although the sleep/wake cycle was 24 hr, a phase angle lag of 2 hr from the imposed night/day mode occurred. A definite desynchronization occurred, with rhythms longer than 24 hr in pCO₂, brain and body temperature, and heart rate. Sleep states were remarkably fragmented and unusually brief in duration. Vestibular and ocular disturbances were evident. These changes

began concurrently with onset of weightlessness and were not secondary to altered fluid balance or body temperature. (Author)

A72-43389 # Calcium metabolism under stress and in repose. R. S. Goldsmith (Mayo Foundation, Rochester, Minn.). In: Life sciences and space research X; Proceedings of the Fourteenth Plenary Meeting, Seattle, Wash., June 21-July 2, 1971.

Berlin, East Germany, Akademie-Verlag, 1972, p. 87-101. 36 refs.

Derangement of calcium metabolism constitutes a major threat to the health of participants in exploration of space. Experiments are described which indicate that during prolonged bed rest osteopenia and complications of the demineralizing process (resorption of bone) develop and endanger the survival of the organism. Such complications include hypercalcemia, hypercalciuria and nephrolithiasis, and muscle wasting. Available techniques for study of the effects of weightlessness and prophylactic agents are outlined. F.R.L.

A72-43390 # Influence of Cosmos 368 space flight conditions on radiation effects in yeasts, hydrogen bacteria and seeds of lettuce and pea. Iu. G. Grigor'ev, V. P. Benevolenskii, Iu. P. Druzhinin, Iu. I. Shidarov, V. I. Korogodin, L. V. Nevzgodina, A. T. Miller, and L. S. Tsarapkin (Institute of Medical and Biological Problems, Moscow, USSR). In: Life sciences and space research X; Proceedings of the Fourteenth Plenary Meeting, Seattle, Wash., June 21-July 2, 1971. Berlin, East Germany, Akademie-Verlag, 1972, p. 113-118.

A72-43391 * # OFO experimental techniques and preliminary conclusions - Is artificial gravity needed during prolonged weightlessness. T. Gualtierotti and F. Bracchi (Milano, Università, Milan, Italy). In: Life sciences and space research X; Proceedings of the Fourteenth Plenary Meeting, Seattle, Wash., June 21-July 2, 1971.

Berlin, East Germany, Akademie-Verlag, 1972, p. 121-132. 13 refs. Contract No. NASW-2211.

The technique of single unit recording from body systems generating electrical pulses coherent with their basic function (CNS, muscles, sense organs) has been proved feasible during the OFO A orbital flight, an automatic physiological experiment. The results of recording 155 hours of orbital flight of pulses from the nerve fibres of four vestibular gravity sensors in two bull frogs indicate that the vestibular organ adjusts to zero g. As all the other biological changes observed during orbit are due to lack of exercise, it is concluded that artificial gravity might not be necessary during prolonged space missions or on low gravity celestial bodies. (Author)

A72-43392 # Physiological and hematological effects of chronic irradiation. Iu. G. Grigor'ev, B. A. Markelov, V. I. Popov, A. A. Akhunov, T. P. Tsessarskaia, A. V. Iliukhin, N. L. Fedorova, T. E. Burkovskaia, and A. V. Shafirkin (Institute of Medical and Biological Problems, Moscow, USSR). In: Life sciences and space research X; Proceedings of the Fourteenth Plenary Meeting, Seattle, Wash., June 21-July 2, 1971. Berlin, East Germany, Akademie-Verlag, 1972, p. 147-154.

A three-year experiment was carried out in which 180 dogs were exposed to irradiation, simulating the dose value and rate of exposure that may occur in a real space flight of long duration. The exposure included a chronic irradiation (with dose rates of 21, 62 and 125 rads/year) and a combined irradiation during which the animals were exposed to chronic and acute irradiations with a dose of 8 or 42 rads applied three times every year, the annual total dose being 120 or 188 rads, respectively. Insignificant hematopoietic changes were found. Distinct changes in the reproductive function were noted. The general condition of the animals was satisfactory. (Author)

A72-43393 # Summary of latent effects in long term survivors of whole body irradiations in primates. J. H. Kirk, H. W. Casey, and J. E. Traynor (USAF, School of Aerospace Medicine, Brooks AFB, Tex.). In: Life sciences and space research X; Proceedings of the Fourteenth Plenary Meeting, Seattle, Wash., June 21-July 2, 1971. Berlin, East Germany, Akademie-Verlag, 1972, p. 165-173. 10 refs.

The USAF School of Aerospace Medicine is maintaining a colony of over 450 primates in which the whole body has been exposed to various types of space radiation including protons and electrons. The majority of the primates (*Macaca mulatta*) were exposed during 1965. Types of radiation involved are 2 MeV X-rays, 5 MeV-2.3 GeV protons, and 1.6 MeV electrons. Data are available in the following areas: chronic skin changes; testicular atrophy; cataractogenesis; hematological and serum biochemical analysis; incidence of tumors; causes of death; body weight variations; and summary of alpha particle experiences. (Author)

A72-43394 # Analysis of survival and cause of death statistics for mice under single and duration-of-life gamma irradiation. D. Grahn, R. J. M. Fry, and R. A. Lea (Argonne National Laboratory, Argonne, Ill.). In: Life sciences and space research X; Proceedings of the Fourteenth Plenary Meeting, Seattle, Wash., June 21-July 2, 1971. Berlin, East Germany, Akademie-Verlag, 1972, p. 175-186. 10 refs. AEC-supported research.

A72-43395 # Effects of simulated space vacuum on bacterial cells. H. Bucker, G. Horneck, R. Facius, M. Schwager, C. Thomas, G. Turcu, and H. Wollenhaupt (Frankfurt, Universität, Frankfurt am Main, West Germany). In: Life sciences and space research X; Proceedings of the Fourteenth Plenary Meeting, Seattle, Wash., June 21-July 2, 1971. Berlin, East Germany, Akademie-Verlag, 1972, p. 191-195. 9 refs.

The effect of vacuum on bacterial cells is related to water desorption. Below water vapour pressure, the inactivation remains constant, independent of total pressure and exposure time. In subsequent growth, the lag-phase of the survivors is delayed. Combined treatment with vacuum and radiation (X-rays or UV of 254 nm wavelength) results in synergistic effects, whereas vacuum and heat can act antagonistically. The vacuum inactivated cells (indicated as loss of colony-forming ability) are completely damaged. The cellular membrane becomes permeable by vacuum exposure; biomolecules are released from the cells when re-suspended after vacuum treatment. (Author)

A72-43396 * # Biological instrumentation for the Viking 1975 mission to Mars. H. P. Klein (NASA, Ames Research Center, Moffett Field, Calif.) and W. Vishniac (Rochester, University, Rochester, N.Y.). In: Life sciences and space research X; Proceedings of the Fourteenth Plenary Meeting, Seattle, Wash., June 21-July 2, 1971. Berlin, East Germany, Akademie-Verlag, 1972, p. 201-210. 13 refs.

A brief introduction is given on why Mars is of interest from a biological point of view, along with an overview of the Viking 1975 mission. Details are given about the four biology instruments aboard the spacecraft and the experiments for which they are to be used. These are: the carbon assimilation experiment to determine whether the soil is biologically active; the label release experiment to detect metabolic activity by the release of radioactive CO₂ from C-14 labelled simple organic substrates; the gas exchange experiment to detect biological activity by repeated gas chromatography analysis of soil samples; and the light scattering experiment, where increase of scattering and decrease of light transmission would indicate the growth of organisms. Examples are given of data obtained with terrestrial soils in these experiments. (Author)

A72-43425 # A study of USAF survival accidents 1 Jan. 1965-31 Dec. 1969. H. G. Munson (USAF, Directorate of Aerospace

Safety, Norton AFB, Calif.). *SAFE Engineering*, vol. 2, 3rd Quarter, 1972, p. 15-19.

A72-43565 Empirical support for a stochastic model of evolution. R. Holmquist (California, University, Berkeley, Calif.). *Journal of Molecular Evolution*, vol. 1, no. 3, 1972, p. 211-222. 19 refs.

The stochastic model of molecular evolution was used to make a priori predictions for the total number of one-step nucleotide changes required to account for a given number of amino acid substitutions between two homologous proteins. These predictions are now found to be concordant with empirical data summarized by Dayhoff et al. (1969). Correction factors are derived for adjusting the 'leg lengths' of phylogenetic trees. It is shown that the operations of constructing the phylogenetic tree and applying the correction algorithm are not commutative with respect to obtaining the leg lengths. The effect of this on certain published phylogenies is discussed. It is suggested that, as a first approximation, at any given point in evolutionary time, enthalpic (selective) forces determine the number and position of those codon sites which are free to vary, whereas within these variable sites, entropic (random) processes determine the course of evolution at the molecular level. (Author)

A72-43568 The calcitonins - An example of unusual evolution. M. Staehelin (Ciba-Geigy, Ltd., Basel, Switzerland). *Journal of Molecular Evolution*, vol. 1, no. 3, 1972, p. 258-262. 11 refs.

The amino acid replacements in the calcitonins from five different species (human, bovine, ovine, porcine and salmon) have been analyzed according to the genetic code. More mutations separate the presumed common mammal from the artiodactyls than from either salmon or man. (Author)

A72-43570 * Recently published protein sequences. I. T. H. Jukes and R. Holmquist (California, University, Berkeley, Calif.). *Journal of Molecular Evolution*, vol. 1, no. 3, 1972, p. 273-290. 18 refs. Grant No. NGR-05-003-020.

Some polypeptide sequences that have been published in the 1972 scientific literature are listed. Only selected sequences are included. The compilation has two objectives. Current information between periods when more comprehensive compilations are published is to be assembled and the use of data that do not include arrangements of unsequenced peptides for 'maximum homology' is to be encouraged. G.R.

A72-43619 Spacecraft contamination problems (Kontaminationsprobleme bei Raumflugkörpern). W. Wilkens (Deutsche Forschungs- und Versuchsanstalt für Luft- und Raumfahrt, Institut für Flugzeugbau, Braunschweig, West Germany). (*Deutsche Gesellschaft für Luft- und Raumfahrt, Jahrestagung, 4th, Baden-Baden, West Germany, Oct. 1971.*) *Raumfahrtforschung*, vol. 16, July-Aug. 1972, p. 174-179. 13 refs. In German.

The evaporation and outgassing of materials in vacuum and the sorption of vapours on surfaces may yield severe degradation of the functional properties of spacecraft. After referring to a number of materials as potential contamination sources in spacecraft, transport and sorption phenomena are discussed. The comments are partially based on new measurements, especially on the outgassing of plastics, coatings and bearings in vacuum and the sorption of vapours on special surfaces. (Author)

A72-43635 # A large-scale model of the human cardiovascular system and its application to ballistocardiography. D. M. Auslander (California, University, Berkeley, Calif.), T. E. Lobdell (GM Technical Center, Warren, Mich.), and D. Chong (General Electric Co., San Jose, Calif.). (*American Society of Mechanical Engineers, Paper 72-Aut-Q, 1972.*) *ASME, Transactions, Series G*

Journal of Dynamic Systems, Measurement, and Control, vol. 94, Sept. 1972, p. 230-238. 24 refs. NIH-supported research.

A72-43804 **Role of eye movements in the perception of apparent motion.** R. T. Kintz and R. F. Witzel (Eastman Kodak Research Laboratories, Rochester, N.Y.). *Optical Society of America, Journal*, vol. 62, Oct. 1972, p. 1237, 1238.

In the light of some motion picture perception experiments, a complex interaction is discussed between apparent motion and flicker, when the flicker rate in motion pictures is increased to a point of perceptual fusion. The form of interaction involved is attributed to visual sensation persistence and pursuit-tracking eye movements. M.V.E.

A72-43811 **A rapid assay of dipolar and extradiapolar content in the human electrocardiogram.** L. G. Horan, N. C. Flowers, and C. B. Miller (U.S. Veterans Administration Hospital; Georgia, Medical College, Augusta, Ga.). *Journal of Electrocardiology*, vol. 5, no. 3, 1972, p. 211-223. 27 refs. Research supported by the American Heart Association; Grant No. PHS-HE-11667.

A72-43812 **The standard 12-lead scalar electrocardiogram - An assessment of left ventricular performance.** J. H. Thomsen, D. A. Spring (Wisconsin, University; U.S. Veterans Administration Hospital, Madison, Wis.), R. H. Wasserburger (Wisconsin, University, Madison, Wis.), and J. C. Buell. *Journal of Electrocardiology*, vol. 5, no. 3, 1972, p. 225-231. 12 refs.

A72-43813 **Continuous recording of His bundle electrogram during selective coronary cineangiography in man.** F. K. Nakhjavan (Albert Einstein Medical Center; Temple University, Philadelphia, Pa.). (*American Heart Association, Scientific Sessions, 44th, Anaheim, Calif., Nov. 11-14, 1971.*) *Journal of Electrocardiology*, vol. 5, no. 3, 1972, p. 233-242. 8 refs.

Continuous recording of His bundle electrogram (HBE) was obtained during coronary cineangiography in 27 patients. Twelve patients had normal or slight coronary artery disease and 15 had severe coronary artery disease. Sinus bradycardia and prolongation of A-H interval were the most important findings, while there was no change in H-V interval. Since sinus bradycardia and A-H prolongation did not always correlate with the injection into the artery which gave origin to the sinus node and atrioventricular node arteries, the presence of a neurogenic reflex mechanism is suggested. (Author)

A72-43814 **Excitation contraction correlates in true ischemia.** D. T. Miller (Heidelberg, Universität, Heidelberg, West Germany) and J. P. Gilmore (Nebraska, University, Omaha, Neb.). *Journal of Electrocardiology*, vol. 5, no. 3, 1972, p. 257-264. 40 refs. Grant No. NIH-HE-10616-03.

Measurements of force of contraction, intracellular action potential, potassium balance and oxygen consumption have been made in blood perfused, mechanically unloaded dog hearts prior to and during periods of ischemia. The results of the study are consistent with the hypothesis that during ischemia, elevation of interstitial potassium concentration results in an abbreviation of the plateau and a decrease in the maximum upstroke velocity of the action potential which in turn results in a diminished force of contraction. (Author)

A72-43905 # **Adrenal morphology changes in rats subjected to hypokinesia (Morfologicheskie izmeneniia nadpochechnikov krysi pri gipokinezii).** I. L. Iurgens and O. I. Kirillov. *Kosmicheskaiia Biologiia i Meditsina*, vol. 6, July-Aug. 1972, p. 3-6. 15 refs. In Russian.

Study of the adrenal morphology in male rats sacrificed after 12 hr, 2, 5, 9, 14, and 19 days of tight, uninterrupted, individual confinement. Under hypokinetic conditions, the adrenal weight was found to increase because of enlargement of the zone fasciculata. With longer confinement, adrenal hypertrophy decreased while dystrophy developed. M.V.E.

A72-43906 # **Influence of a high oxygen content on the rate of formation and elimination of gaseous wastes in albino rats (Vliianie vysokogo soderzhaniiia kisloroda na intensivnost' obrazovaniia i vydelenie belymi krysumi nekotorykh gazoobraznykh produktov zhiznedeiatel'nosti).** B. I. Abidin, V. V. Kustov, T. A. Lekareva, K. P. Bugar', L. T. Poddubnaia, and V. I. Belkin. *Kosmicheskaiia Biologiia i Meditsina*, vol. 6, July-Aug. 1972, p. 6-9. 14 refs. In Russian.

A72-43907 # **Mechanism of adaptation to hypoxic hypoxia (O mekhanizme adaptatsii k gipoksicheskoi gipoksii).** V. I. Dedukhova, E. V. Loginova, V. B. Malkin, E. N. Mokhova, and N. A. Roshchina. *Kosmicheskaiia Biologiia i Meditsina*, vol. 6, July-Aug. 1972, p. 9-14. 15 refs. In Russian.

Comparison of tissue respiration and brain morphology indices with the morphological indices characterizing the altitude adaptation degree in an organism. The results obtained support the hypothesis that no adaptive shifts in tissue respiration take place in the course of pressure chamber training. M.V.E.

A72-43908 # **Conservation time limits of heightened organism resistance under various altitude acclimatization conditions (O srokakh sokhraneniia povyshennoi rezistentnosti organizma pri vazlichnykh rezhimakh akklimatizatsii k vysokogor'iu).** M. M. Mirrakhimov, A. A. Aidaraliev, and M. D. Dzhusushev. *Kosmicheskaiia Biologiia i Meditsina*, vol. 6, July-Aug. 1972, p. 14-18. 17 refs. In Russian.

Investigation of the 'altitude ceiling' in the acclimatization of white rats as a function of acclimatization time length. The obtained results indicate that the highest 'altitude ceiling' is reached between the 45th and 60th acclimatization day. After 15 to 30 days of acclimatization, the enhanced resistance to hypoxia is maintained for 20 to 30 days. M.V.E.

A72-43909 # **Influence of a preliminary exposure to carbon monoxide on the development of hypokinetic disturbances in albino rats (Vliianie predvaritel'nogo vozdeistviia oksii ugleroda na razvitiie gipokinetcheskikh rasstroistv u belykh krysi).** V. V. Kustov, B. I. Abidin, V. I. Belkin, and L. T. Poddubnaia. *Kosmicheskaiia Biologiia i Meditsina*, vol. 6, July-Aug. 1972, p. 18-21. 8 refs. In Russian.

A72-43910 # **Influence of X-ray irradiation in 25- and 250-r doses on the transplant immunity in mice differing by weak and strong histoincompatibility systems (Vliianie Rentgenovskogo obluicheniia v doze 25 i 250 r na transplantatsionnyi immunitet u myshei, razlichaiushchikhsia po slaboi i sil'noi sisteme gistesovmestimosti).** P. Cherski, P. Korda, W. Kurnatovski, V. Novakovski, T. Obara, and Ia. Vengel. *Kosmicheskaiia Biologiia i Meditsina*, vol. 6, July-Aug. 1972, p. 22, 23. 5 refs. In Russian.

A72-43911 # **Evaluation of the functional granulocytopenic condition by means of a pyrogenal test (Otsenka funktsional'nogo sostoiianiia granulotsitopoeza s pomoshch'iu pirogenalovoi probi).** E. S. Zubenkova and B. A. Markelov. *Kosmicheskaiia Biologiia i Meditsina*, vol. 6, July-Aug. 1972, p. 24-26. 10 refs. In Russian.

Description of the response of healthy dogs to intramuscular injections of a pyrogen, called 'pyrogenal', at doses of 1 microgram

per kg of body weight. The response is shown to be characterized by a transient leukopenia followed by a pronounced leukocytosis.

M.V.E.

A72-43912 # Simulation of the physiological effects of weightlessness in a 30-day experiment (30-sutochnyi eksperiment s modelirovaniem fiziologicheskikh effektov nevesomosti). A. M. Genin and L. T. Kakurin. *Kosmicheskaya Biologiya i Meditsina*, vol. 6, July-Aug. 1972, p. 26-28. In Russian.

Review of the conduct and results of a 30-day experiment aimed at investigating the validity of methods used in simulating the physiological effects of weightlessness and in evaluating applicable prophylactics. The results obtained include findings leading to a positive evaluation of a number of tested prophylactics. M.V.E.

A72-43913 # Experiment organization and the health condition of test subjects (Organizatsiya eksperimentov i obshchee sostoianie ispytuemykh). A. D. Voskresenskii, B. B. Egorov, I. D. Pestov, S. M. Belashin, V. M. Tolstov, and I. S. Lezhin. *Kosmicheskaya Biologiya i Meditsina*, vol. 6, July-Aug. 1972, p. 28-32. In Russian.

Investigation of changes in the health condition of 15 male subjects confined to strict bed rest for a period of 30 days. Six subjects were kept in a recumbent position and nine in an antiorthostatic one. Daily 6-hour long applications of lower-body negative pressure (LBNP) during recumbent bed rest resulted in the development of overtraining symptoms, a decline in tolerance to LBNP, and a pronounced general asthenia. Applied only from the 26th to the 30th day of recumbent bed rest, LBNP exerted a favorable effect on the test subjects. As for the subjects kept in the antiorthostatic position, they experienced a blood rush to the head during the first hours of bedrest, but then largely adapted in the course of two days, though some of the symptoms endured up to two weeks. M.V.E.

A72-43914 # Changes in cerebral, pulmonary, and peripheral circulation (Izmeneniya mozgovogo, legochnogo i perifericheskogo krovoobrashcheniya). Kh. Kh. Iarullin, T. N. Krupina, T. D. Vasil'eva, and N. N. Buivolova. *Kosmicheskaya Biologiya i Meditsina*, vol. 6, July-Aug. 1972, p. 33-39. 25 refs. In Russian.

Rheographic investigation of the cerebral, pulmonary, and peripheral circulation in 9 healthy young test subjects confined to bed rest with the head in a downward position at an angle of 4 deg for a period of 30 days. A certain phase sequence has been observed in the regional circulation changes. Rheographic symptoms of increased arterial blood influx and venous congestion were attended by face reddening and feelings of blood rush to the head. Later these symptoms subsided in the brain and intensified somewhat in the crus. M.V.E.

A72-43915 # Cardiac output and gas exchange variations at bed rest during hypokinesia (Izmenenie serdechnogo vybrosa i gazoobmena v pokoe pri gipokinezii). Iu. D. Pometov and B. S. Katkovskii. *Kosmicheskaya Biologiya i Meditsina*, vol. 6, July-Aug. 1972, p. 39-46. 33 refs. In Russian.

Study of variations in hemodynamics and gas exchange as a function of basal metabolism in 15 healthy male test subjects confined to bed rest for a period of 30 days, 6 in a recumbent position and 9 in an antiorthostatic one. Regardless of position, all 15 subjects showed a significant decline in gas exchange. Subjects who performed some physical exercise or underwent electric muscle stimulation exhibited a lesser decline. Subjects who were in the antiorthostatic position displayed an increase in cardiac output already on the first day of bed rest, whereas those in the recumbent position showed it only on the sixth bed rest day. M.V.E.

A72-43916 # State of the optic analyzer during hypokinesia (Sostoianie zritel'nogo analizatora v usloviakh gipokinezii). N. T. Drozdova and E. P. Grishin. *Kosmicheskaya Biologiya i Meditsina*, vol. 6, July-Aug. 1972, p. 46-49. In Russian.

Study of the short- and long-range visual acuity in test subjects, confined to bed rest for 30 days in an antiorthostatic position. Ophthalmoscopic, photocalibrometric, and ophthalmodynamometric observation and measurement results are presented and discussed. M.V.E.

A72-43917 # Investigation of otorhinolaryngological organ reactions in man under hypokinesia (Issledovanie reaktsii lororganov cheloveka pri gipokinezii). I. Ia. Iakovleva, V. P. Baranova, L. N. Kornilova, M. B. Nefedova, E. V. Lapaev, and S. R. Raskatova. *Kosmicheskaya Biologiya i Meditsina*, vol. 6, July-Aug. 1972, p. 49-54. 10 refs. In Russian.

Review of the results of otorhinolaryngological organ response observations during a 30-day antiorthostatic bed rest experiment on 9 healthy male test subjects divided into three groups of three people each. The first group performed physical exercises while staying in bed, the second one represented the controls, and the third underwent electric muscle stimulation. Audiometry, ototopia (i.e., auditory spatial orientation), rhinopneumometry, and otolithometry measurements were performed upon all test subjects. Dynamic rhinopneumometry revealed congestion in nasal mucosa vessels and tone lability in the test subjects of all the groups. Audiometric measurements showed similar changes in loudness and ototopia functions for all the test subjects. Determined hearing thresholds showed appreciable changes in subjects with incipient cochlear neuritis. M.V.E.

A72-43918 # Lung volume of people staying in antiorthostatic position under application of various prophylactics (Legochnyye ob'emy pri prebyvanii liudei v antiortostaticheskom polozenii s primeneniem razlichnykh sredstv profilaktiki). B. S. Katkovskii and V. A. Andretsov. *Kosmicheskaya Biologiya i Meditsina*, vol. 6, July-Aug. 1972, p. 55-59. 8 refs. In Russian.

In a 30-day bed experiment, changes in total lung capacity and other lung volume variables were studied upon three groups of three test subjects each, in hospital beds whose lower (i.e., foot) ends were raised to a 4-deg angle above the horizontal. The first group performed physical exercises in bed, the second represented the control group, and the third underwent electric muscle stimulation. A varying extent of initial lung volume decline was observed in all three groups. In the first, this decline endured to the end of the experiment. In the second and third groups, the pretest lung volume was restored and then exceeded on the 17th and 5th day, respectively. The possible causes of these changes are discussed. M.V.E.

A72-43919 # Lower-body negative pressure as a method of preventing shifts associated with changes in the hydrostatic pressure of blood (Otritsatel'noe davlenie na nizhniiu chast' tela kak metod profilaktiki sdvigoz svyazannykh s izmeneniyem gidrostaticheskogo davleniya krovi). I. D. Pestov and B. F. Asiamolov. *Kosmicheskaya Biologiya i Meditsina*, vol. 6, July-Aug. 1972, p. 59-64. 5 refs. In Russian.

A72-43920 # Physical training as a prophylactic measure against the hypodynamic syndrome (Fizicheskaya trenirovka kak metod profilaktiki gipodinamicheskogo sindroma). V. I. Stepanov, M. A. Tikhonov, and A. V. Eremin. *Kosmicheskaya Biologiya i Meditsina*, vol. 6, July-Aug. 1972, p. 64-68. In Russian.

A72-43921 # Effects of physical training and electric muscle stimulation on the metabolism (Vlianiye fizicheskoi trenirovki i elektrostimulyatsii na obmen veshchestv). I. S. Balakhovskii, V. T.

Bakhteeva, R. V. Beleda, E. I. Biriukov, L. A. Vinogradova, A. I. Grigor'ev, S. I. Zakharova, I. G. Dlusskaia, R. K. Kiselev, and T. A. Kislovskaya. *Kosmicheskaya Biologiya i Meditsina*, vol. 6, July-Aug. 1972, p. 68-72. 7 refs. In Russian.

Investigation of metabolic changes occurring during bed rest, and study of the possibility of preventing these changes by physical exercises and electric muscle stimulation. It is shown that it is possible to curb to some extent the unfavorable effects of bed rest by these means. M.V.E.

A72-43922 # Cerebral hemodynamics during 120-day clinostatic hypokinesia (Tserebral'naya gemodinamika pri 120-sutochnoi klinostaticheskoi gipokinezii). A. Ia. Tizul, B. V. Kozlov, and G. V. Anan'ev. *Kosmicheskaya Biologiya i Meditsina*, vol. 6, July-Aug. 1972, p. 72-77. 12 refs. In Russian.

Study of the cerebral hemodynamics by the rheoencephalographic and occlusion plethysmography methods in ten healthy male subjects during the course of a 120-day period of clinostatic hypokinesia and a three-week recovery period. The prolonged bed rest experiment was found to produce phasic changes in the cerebral hemodynamics with a tendency toward a reduction of the blood filling and a deterioration of the tone of the brain vessels. The most distinguishing feature of the indices characterizing the brain hemodynamics is their instability and the large scatter of the numerical values from one study to the next. These changes noted during prolonged bed rest are attributed to lability of the nerve centers controlling the activity of the systems responsible for the adaptive dynamics and rearrangement of the functions of the organism at a new level of adjustment. This is attested to by the progressively increasing clinical syndrome of vegetative-vascular dystonia and nervous-psycho-asthenization of the organism. A.B.K.

A72-43923 # The simultaneous action of stimulants and tranquilizers on the efficiency of a human operator (Sovmestnoe deistvie stimulatorov i trankvilizatorov na rabotosposobnost' cheloveka-operatora). G. D. Glod, V. E. Belai, P. V. Vasil'ev, and T. A. Orlova. *Kosmicheskaya Biologiya i Meditsina*, vol. 6, July-Aug. 1972, p. 77-83. 23 refs. In Russian.

Study of the effect of the simultaneous action of trioxazine and centredrine on the efficiency of human operators performing continuous compensator tracking tasks. The effect of the stimulant and the tranquilizer taken separately and together on the respiration rate, the heart contraction rhythm, arterial pressure, the time required for a simple sensorimotor reaction, and the mismatch signal during compensator tracking was determined. From an analysis of the sensorimotor reactions and the efficiency of compensator tracking it is concluded that a summation of the effects of the stimulant and the tranquilizer occurs when both are administered simultaneously. It is also concluded that substances with different actions have a one-sided effect on the efficiency of a human operator. A.B.K.

A72-43924 # Determination of copper, iron, cobalt, nickel, and manganese in biological samples of vegetable origin (Opredelenie medi, zheleza, kobal'ta, nikelia i margantsa v biologicheskikh probakh rastitel'nogo proiskhozhdeniya). N. B. Krotova and A. P. Tereshchenko. *Kosmicheskaya Biologiya i Meditsina*, vol. 6, July-Aug. 1972, p. 83-88. 6 refs. In Russian.

Description of the extraction of copper, iron, cobalt, nickel, and manganese in the form of complexes with the reagent HMA, and outline of a method of extracting and determining these elements in biological objects. The results of a study of the dependence of the extraction of hexamethylene dithiocarbaminates of copper, iron, cobalt, nickel, and manganese in chloroform on the pH of the medium showed that for all elements with an increase in the HMA concentration the range of pH values of total extraction of complexes increases. A study is made of the dependence of the coefficient of distribution of the metal between the aqueous and

organic phases on the equilibrium concentration of the reagent anion in the aqueous phase, in order to ascertain a possible uptake of the hydroxyl group in molecules of intracomplex compounds. A.B.K.

A72-43933 Effects of coronary arteriography on myocardial blood flow. F. E. Kloster, W. G. Friesen, G. S. Green, and M. P. Judkins (Oregon, University, Portland, Ore.). *Circulation*, vol. 46, Sept. 1972, p. 438-444. 26 refs. Grant No. PHS-HE-06336.

Myocardial blood flow responses to selective coronary arteriography were studied in 22 patients. Left coronary flow was estimated by the radioactive inert-gas (Xe-133) washout technique using precordial detection. Duplicate control studies were obtained before radiocontrast injection and test studies were performed at 1 min and 3, 5, or 7 min after angiography. Myocardial flow increased in every patient 1 min after contrast injection. Blood flow increased further in seven of 10 studied at 3 min and remained elevated at 5 and 7 min. Systemic pressure was unchanged from the control level, so coronary vascular resistance decreased in proportion to the increase in flow. Blood flow responses in patients with coronary artery disease were no different from normal subjects. Sham injections of normal saline produced no increase in coronary flow. Selective coronary arteriography results in a prompt increase in myocardial blood flow which persists for several minutes. The probable mechanism is coronary vasodilatation produced by the markedly hypertonic contrast material, an effect demonstrated previously in other vascular beds. (Author)

A72-43934 * Evaluation of the pulse-contour method of determining stroke volume in man. E. L. Alderman, A. Branzi, W. Sanders, B. W. Brown, and D. C. Harrison (Stanford University, Stanford, Calif.). *Circulation*, vol. 46, Sept. 1972, p. 546-558. 13 refs. Grants No. NIH-HE-5709; No. NIH-HE-5866; No. NGL-05-020-305.

The pulse-contour method for determining stroke volume has been employed as a continuous rapid method of monitoring the cardiovascular status of patients. Twenty-one patients with ischemic heart disease and 21 patients with mitral valve disease were subjected to a variety of hemodynamic interventions. The pulse-contour estimations, using three different formulas derived by Warner, Kouchoukos, and Herd, were compared with indicator-dilution outputs. A comparison of the results of the two methods for determining stroke volume yielded correlation coefficients ranging from 0.59 to 0.84. The better performing Warner formula yielded a coefficient of variation of about 20%. The type of hemodynamic interventions employed did not significantly affect the results using the pulse-contour method. Although the correlation of the pulse-contour and indicator-dilution stroke volumes is high, the coefficient of variation is such that small changes in stroke volume cannot be accurately assessed by the pulse-contour method. However, the simplicity and rapidity of this method compared to determination of cardiac output by Fick or indicator-dilution methods makes it a potentially useful adjunct for monitoring critically ill patients. (Author)

A72-43935 Collagen in human myocardium as a function of age. J. E. Lenkiewicz, M. J. Davies, and D. Rosen (Chelsea College; St. George's Hospital, London, England). *Cardiovascular Research*, vol. 6, Sept. 1972, p. 549-555. 15 refs. Research supported by the Science Research Council.

An automated flying spot microscope has been used to estimate the volume proportion of collagen gel in myocardium. Observations were limited to the interventricular septum and 40 specimens were examined, nearly all from normal hearts in the age range 13-92 yr. A small but significant increase with age was found for collagen gel in regions in which the muscle fibers were predominantly transverse - that is, in the subendocardial and subpericardial zones - although there was no significant increase where they were predominantly longitudinal - that is, in the central myocardial zone. (Author)

A72-43936 **Stress concentrations induced by flow.** S. Rodbard and M. Farbstein (City of Hope Medical Center, Duarte, Calif.). *Cardiovascular Research*, vol. 6, Sept. 1972, p. 562-568. 13 refs. Grant No. PHS-HE-08721.

A mixture of gelatin and agar which responds photoelastically to pressure differences and to other stresses of the magnitudes observed in the cardiovascular system has been developed. Water was made to flow through channels whose walls were formed by the gelatin-agar mixture. The stress patterns produced were examined by photoelastic techniques. The technique offers a means for the analysis of mechanical stresses on the walls of blood vessels. G.R.

A72-43937 **A critical assessment of an open circuit technique for measuring oxygen consumption.** C. T. Kappagoda and R. J. Linden (Leeds University, Leeds, England). *Cardiovascular Research*, vol. 6, Sept. 1972, p. 589-597. 7 refs. Research supported by the British Heart Foundation, Medical Research Council, and Wellcome Trust.

An open circuit technique, incorporating a paramagnetic oxygen analyser, for the measurement of oxygen consumption is described. The characteristics of the oxygen analyser were examined. Known oxygen consumptions obtained by a 'nitrogen dilution' technique were used and the accuracy of the technique determined. The method was also compared with a conventional method of measuring oxygen consumption using the collection and analysis of expired air. (Author)

A72-43938 **The scattergram - A new method for continuous electrocardiographic monitoring.** P. Stinton, J. Tinker, J. C. Vickery, and S. P. Vahl (Hammersmith Hospital; Royal Postgraduate Medical School; Imperial College of Science and Technology, London, England). *Cardiovascular Research*, vol. 6, Sept. 1972, p. 598-604. Research supported by the Leverhulme Foundation.

A great deal of information can be obtained by observing variations in interbeat (R-R) intervals over a period of time. A bedside display based on the relationship of adjacent R-R intervals (scattergram) overcomes some of the disadvantages of the conventional display and provides an immediate and graphic means of observing the onset and development of arrhythmias. The scattergram is a plot on Cartesian coordinates of points whose position in the horizontal direction represents the duration of the last recorded interbeat interval, while the position in the vertical direction indicates the duration of the last but one interval. Aspects of the basic scheme are discussed together with the trigger mechanism, the setting-up procedure, and the instrument performance. G.R.

A72-43940 * **Visual perception of accelerated nitrogen nuclei interacting with the human retina.** T. F. Budinger, J. T. Lyman, and C. A. Tobias (California, University, Berkeley, Calif.). *Nature*, vol. 239, Sept. 22, 1972, p. 209-211. 17 refs. AEC-NASA-supported research.

Visual phenomena have now been observed in high-energy nitrogen beams produced at the Berkeley Bevatron. Using a nitrogen beam deflected at about 266 MeV/nucleon, three scientifically trained subjects made a series of observations. These observations confirm earlier hypotheses and argue for electronic excitation in or near the outer segments as the important mechanism. A picture showing a simplified anatomy of the left eye in horizontal section is presented. Three regions where various beam positions intercepted visual nervous structures are indicated. G.R.

A72-43978 **Peripheral motion detection and refractive error.** H. W. Leibowitz, C. A. Johnson, and E. Isabelle (Pennsylvania State University, University Park, Pa.). *Science*, vol. 177, Sept. 29, 1972, p. 1207, 1208. 6 refs. Grant No. NIH-MH-08061.

Motion thresholds were determined for the fovea and peripheral retina with and without correction for peripheral refractive error. With correction, motion thresholds decreased and individual differences disappeared. These results imply that under normal observation conditions, peripheral sensitivity is limited mainly by dioptric rather than retinal variables. (Author)

A72-43995 * **Capillary circulation as a regulator of sodium reabsorption and excretion.** L. E. Earley, M. H. Humphreys (California, University, San Francisco, Calif.), and E. Bartoli. *Circulation Research*, vol. 31, Sept. 1972, Supplement no. 2, p. II-1 to II-14; Discussion, p. II-14 to II-18. 66 refs. Grants No. NIH-AM-12753; No. NIH-AM-05670; No. NGR-05-125-007.

A72-43996 * **Use of implantable telemetry systems for study of cardiovascular phenomena.** H. Sandler, T. B. Fryer, R. M. Westbrook (NASA, Ames Research Center, Moffett Field, Calif.; USAF, School of Aerospace Medicine, Brooks AFB, Tex.), and H. L. Stone (Texas, University, Galveston, Tex.). *Circulation Research*, vol. 31, Sept. 1972, Supplement no. 2, p. II-85 to II-98; Discussion, p. II-98 to II-100. 49 refs. NASA-supported research. NASA Order A-94544.

Preliminary observations of cardiovascular function have been made in four chimpanzees using multichannel implantable units. Measurements of right- and left-sided pressures were periodically made in these animals over a four-month period, including continuous observations for selected 24-hour periods. Pressures recorded with animals in an awake, unanesthetized, unrestrained state were much lower than pressures reported for restrained animals in similar situations. Diurnal variations of pressure tended to occur, but were not as clear-cut as those reported to occur for humans. The ability to implant a transmitter chronically and receive useful multichannel information in the chimpanzee encourages the future use of such implant devices as part of the control system for an artificial heart or directly for use in man. (Author)

A72-43997 **Increased fluid turnover and the activity of the renin-angiotensin system under various experimental conditions.** F. Gross, G. Dauda, J. Möhring, H. Orth (Heidelberg, Universität, Heidelberg, West Germany), S. Kazda, and J. Kyncl. *Circulation Research*, vol. 31, Sept. 1972, Supplement no. 2, p. II-173 to II-181. 11 refs. Research supported by the Deutsche Forschungsgemeinschaft.

A72-43998 **Metabolism of angiotensin II in sodium depletion and hypertension in humans.** C. I. Johnston, F. A. O. Mendelsohn, and A. E. Doyle (Austin Hospital, Heidelberg, Victoria, Australia). *Circulation Research*, vol. 31, Sept. 1972, Supplement no. 2, p. II-203 to II-213. 50 refs. Research supported by National Heart Foundation and National Health and Medical Research Council of Australia.

A72-44076 # **Some data on the interrelations of conscious and unconscious reactions (Nekotorye dannye o vzaimootnoshenii osoznannykh i neosoznannykh reaktsii).** L. G. Voronin (Moskovskii Gosudarstvennyi Universitet, Moscow; Akademiia Nauk SSSR, Institut Biofiziki, Pushchino-on-Oka, USSR). *Zhurnal Vyshei Nervnoi Deiatel'nosti*, vol. 22, July-Aug. 1972, p. 669-678. 6 refs. In Russian.

Experimental investigation of the relation of learning and memory to trace phenomena in the nervous system, the role of these phenomena in forming conscious and unconscious organism responses, and the interrelation of these two kinds of responses. Analyses of EEG and ECG records and of skin-galvanic and oculomotor reactions of 150 test subjects including healthy individuals ranging in age from 5 to 35, on the one hand, and chronic alcoholics and cerebral sclerosis patients complaining of poor memory, on the other, are used in determining the interrelations sought. M.V.E.

A72-44077 # Involuntary eye movements during the performance of mental tasks (Neproizvol'nye dvizheniia glaz pri umstvennoi nagruzke). V. A. Filin (Vsesoiuznyi Nauchno-Issledovatel'skii Institut Meditsinskogo Priborostroeniia, Moscow, USSR) and S. P. Sidorov (Vrachebno-Fizkul'turnyi Dispanser, Moscow, USSR). *Zhurnal Vysshei Nervnoi Deiatel'nosti*, vol. 22, July-Aug. 1972, p. 688-691. 12 refs. In Russian.

Study of involuntary eye movements in adult subjects by means of contactless photoelectric recording methods, while they were solving mentally an arithmetic problem and fixing a point in complete darkness in compliance with the injunction: 'look straight ahead.' Concentration of attention is found to lead to a sharp reduction in the incidence of involuntary eye movements. M.V.E.

A72-44078 # Development of a defensive conditioned reflex to a light stimulus after previous visual deprivation (Formirovanie oboronitel'nogo uslovnogo refleksa na svetovoi razdrashitel' posle rannei zritel'noi deprivatsii). A. A. Volokhov and N. N. Shiliagina (Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR). *Zhurnal Vysshei Nervnoi Deiatel'nosti*, vol. 22, July-Aug. 1972, p. 735-742. 30 refs. In Russian.

A72-44079 # Age-induced long-term memory changes in animals (O vozrastnykh izmeneniiakh dolgovremennoi pamiati u zhivotnykh). G. A. Obraztsova (Akademiia Nauk SSSR, Institut Fiziologii, Leningrad, USSR). *Zhurnal Vysshei Nervnoi Deiatel'nosti*, vol. 22, July-Aug. 1972, p. 752-759. 31 refs. In Russian.

Investigation of the alimentary instrumental reflex in puppies and the shock avoidance reflex in rats from approximately the 25th day following birth up to maturity. The results obtained indicate an inverse correlation between the speed of conditioning and the degree of retention of conditioned reflexes after a two-month interval.

M.V.E.

A72-44080 # Characteristics of conditioned reflexes to an ecologically adequate stimulus in hens (Osobennosti protekaniia uslovnnykh refleksov na ekologicheskii adekvatnyi razdrashitel' u kur). Zh. G. Aleksandrova (Akademiia Nauk Meditsinskikh Nauk SSSR, Leningrad, USSR). *Zhurnal Vysshei Nervnoi Deiatel'nosti*, vol. 22, July-Aug. 1972, p. 766-771. 16 refs. In Russian.

A72-44081 # Electrophysiological analysis of limbic-reticular interaction during the orientating reflex (Elektrofiziologicheskii analiz limbiko-retikuliarnogo vzaimodeistviia pri orientirovochnom refleks). B. I. Kotliar, O. B. Zubova, N. O. Timofeeva, and N. A. Kriuchkova (Moskovskii Gosudarstvennyi Universitet, Moscow, USSR). *Zhurnal Vysshei Nervnoi Deiatel'nosti*, vol. 22, July-Aug. 1972, p. 828-836. 36 refs. In Russian.

A72-44087 # Changes in the impulse activity of cortical neurons during selective reinforcement of a chosen range of their interpulse intervals (Izmeneniia impul'snoi aktivnosti korkovykh neuronov pri izbiratel'nom podkrepnenii vybrannogo diapazona ikh mezhimpul'snykh intervalov). N. N. Vasilevskii, V. V. Trubachev, and N. B. Suvorov (Akademiia Meditsinskikh Nauk SSSR, Leningrad, USSR). *Neirofiziologia*, vol. 4, July-Aug. 1972, p. 339-348. 25 refs. In Russian.

A72-44088 # Synaptic events during specific and non-specific inhibition of visual cortex neurons (Sinapticheskie iavleniia pri spetsificheskoi i nespesificheskoi tormozhenii neuronov zritel'noi kory). V. G. Skrebetskii and I. N. Sharonova (Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR). *Neirofiziologia*, vol. 4, July-Aug. 1972, p. 349-357. 24 refs. In Russian.

Study of changes in membrane potentials during specific and nonspecific inhibition of visual cortex neurons in awake rabbits, by means of intracellular and quasi-intracellular recording. The results obtained indicate that specific inhibition is usually associated with more or less prominent hyperpolarization of the cell membrane. Nonspecific inhibition is not accompanied by significant membrane hyperpolarization. M.V.E.

A72-44089 # Neuronal and focal reactions of the parietal associative cortex to various peripheral stimuli (Neironnye i fokal'nye reaktsii temennoi assotsiativnoi kory na razlichnye perifericheskie razdrasheniia). V. N. Kazakov, V. A. Izmet'ev, and V. D. Perkhurova (Gosudarstvennyi Meditsinskii Institut, Kemerovo, USSR). *Neirofiziologia*, vol. 4, July-Aug. 1972, p. 358-367. 23 refs. In Russian.

A72-44090 # Responses of anterior suprasylvian gyrus neurons to peripheral stimuli of different modalities (Reaktsii neuronov perednego otdela suprasil'vievoi izviliny na perifericheskie razdrasheniia razlichnykh modal'nostei). V. M. Shaban (Akademiia Nauk Ukrainskoi SSR, Institut Fiziologii, Kiev, Ukrainian SSR). *Neirofiziologia*, vol. 4, July-Aug. 1972, p. 368-374. 20 refs. In Russian.

A72-44091 # Post-synaptic potentials of motor neurons of the facial nerve nucleus evoked by afferent and corticofugal pulse stimulation (Postsinapticheskie potentsialy motoneuronov iadra litsevoogo nerva, vyzvannye afferentnoi i kortikofugal'noi impul'satsiei). Iu. P. Limanskii, A. I. Piliavskii, and E. V. Gura (Akademiia Nauk Ukrainskoi SSR, Institut Fiziologii, Kiev, Ukrainian SSR). *Neirofiziologia*, vol. 4, July-Aug. 1972, p. 391-400. 39 refs. In Russian.

A72-44092 # Classification of neurons in the lumbosacral section of the spinal cord according to their discharge during evoked locomotion (Klassifikatsiia neuronov poiasnichno-kresttsovogo otdela spinnogo mozga v sootvetstvii s ikh razriadom pri vyzvannoi lokomotsii). G. N. Orlovskii (Moskovskii Gosudarstvennyi Universitet, Moscow, USSR) and A. G. Fel'dman (Akademiia Nauk SSSR, Institut Problem Peredachi Informatsii, Moscow, USSR). *Neirofiziologia*, vol. 4, July-Aug. 1972, p. 410-417. 15 refs. In Russian.

A72-44150 Complete assimilation of briefly presented lines. R. B. Howard (Colgate University, Hamilton, N.Y.). *Canadian Journal of Psychology*, vol. 26, Sept. 1972, p. 259-267. 16 refs. Research supported by the Sloan Foundation and Colgate Research Council.

Six Ss viewed pairs of parallel lines with unequal lengths which were presented either simultaneously or successively for 30, 100, or 1000 msec. The data suggest that complete assimilation (the distortion of a line's length so that it appears equal to another line presented on the same trial) is a perceptual phenomenon which occurs even when the lines are seen clearly. The frequency of complete assimilation is inversely related to the duration of the assimilated line, and is not related to the duration of the other line presented on the same trial. These results can be explained by a categorization model, although the model must be extended to include input from feature analysers if partial assimilation is to be explained. (Author)

A72-44153 # A special vitamin complex for prophylaxis of atherosclerosis in aviation personnel (Spetsial'nyi vitaminnyi kompleks dlia profilaktiki ateroskleroza v lits letnogo truda). N. S. Molchanov, Iu. F. Udalov, and B. N. Garashov. *Voenno-Meditsinskii Zhurnal*, July 1972, p. 75-77. 8 refs. In Russian.

A72-44154 # Features of a speech signal during cumulative action of Coriolis accelerations (Osobennosti rechevogo signala pri kumulativnom vozdeistvii uskorenii Koriolisa). A. V. Nikonov and F. A. Solodovnik. *Voenno-Meditsinskii Zhurnal*, July 1972, p. 78-81. 8 refs. In Russian.

Experimental study of changes in the acoustical characteristics of speech in male human subjects (25 to 35 years of age) exposed to the action of Coriolis forces eventually producing motion sickness. Graphs and tables illustrate significant changes in the amplitude and frequency of speech resulting from Coriolis accelerations. In the initial phase of the experiment where no vestibulo-vegetative disturbances have yet been produced by the applied Coriolis forces, the speech intensity is shown to rise by 0.5 to 1.5 dB above the preacceleration level. The speech intensity drops from 1 to 2 dB after the onset of motion sickness. Changes in speech frequencies are much more pronounced. T.M.

A72-44243 Conjugate and disjunctive optokinetic eye movements in the rabbit, evoked by rotatory and translatory motion. H. Collewijn and H. Noorduyn (Rotterdam, Medische Faculteit, Rotterdam, Netherlands). *Pflügers Archiv*, vol. 335, no. 3, 1972, p. 173-185. 14 refs.

A72-44244 Modifications of the rate of renewal of norepinephrine in various peripheral organs of the rat during exposure and acclimatization to cold (Modifications du taux de renouvellement de la noradrénaline dans différents organes périphériques du rat au cours de l'exposition et de l'acclimatation au froid). J. Bralet, A. Beley, and A. M. Lallemand (Dijon, Université, Dijon, France). *Pflügers Archiv*, vol. 335, no. 3, 1972, p. 186-197. 32 refs. In French.

A72-44325 * The presence of P700 in chloroplast fragments prepared by short time incubation with Triton X-100. A. F. Esser (NASA, Ames Research Center, Exobiology Div., Moffett Field, Calif.). *Biochimica et Biophysica Acta*, vol. 275, 1972, p. 199-207. 21 refs.

A72-44349 Preprocessing of nerve pulse sequences for analysis by digital computer (Vorverarbeitung von Nervenimpulsfolgen zur Analyse mit dem Digitalrechner). H.-J. Zsagar (Fraunhofer-Gesellschaft zur Förderung der angewandten Forschung, Institut für Informationsverarbeitung in Technik und Biologie, Karlsruhe, West Germany). *Internationale Elektronische Rundschau*, vol. 26, Sept. 1972, p. 213-217. In German.

Studies of signal processing in biological systems can provide helpful information for the solution of technical problems. The visual systems of men and vertebrates as pattern recognizing systems are of particular interest. The system analysis considered has the objective to determine the relation between the input signal and the output signal. Experimental investigations involve the measurement and registration of time intervals between pulse signals. Two electrical devices for collecting data and storing them on a plate of magnetic material are discussed. A digital computer is used for the evaluation of the stored data. The approach described can be used for an evaluation of signals in the case of a system of modulation which makes use of the pulse interval. G.R.

A72-44361 The precise simulation of image transfer systems with the aid of an optical convolution obtained with a rotating slit of prescribed form (Die präzise Simulation von Bildübertragungssystemen durch eine optische Faltung mit einem rotierenden Spalt vorgeschriebener Form). M. Pfeiler and G. Theil (Siemens AG, Erlangen, West Germany). *Nachrichtentechnische Zeitschrift*, vol. 25, Sept. 1972, p. 405-408. 10 refs. In German.

A72-44364 * Evidence for a metabolic limitation of survival in hypothermic hamsters. R. L. Prewitt, G. L. Anderson, and X. J. Musacchia (Missouri, University, Columbia, Mo.). *Society for Experimental Biology and Medicine, Proceedings*, vol. 140, Sept. 1972, p. 1279-1283. 19 refs. Research supported by the University of Missouri; Grants No. NGL-26-004-021; No. PHS-GM-41418-03.

The underlying factors limiting survival in the hypothermic state are studied. Hamsters of both sexes, clipped and unclipped, were induced into profound hypothermia by the helium cold method until they reached a temperature between 7 and 10 C. It appears that the primary cause of death is failure of respiration due to the depletion of carbohydrate energy supplies and may explain why survival time in hypothermia is shorter than the normal hibernation time of the hamster. F.R.L.

A72-44365 Physiologic effects of passive hyperventilation on oxygen delivery and consumption. T. E. Riggs, A. W. Shafer, and C. A. Guenter (Oklahoma, University, Oklahoma City, Okla.). *Society for Experimental Biology and Medicine, Proceedings*, vol. 140, Sept. 1972, p. 1414-1417. 9 refs. Research supported by the U.S. Veterans Administration Hospital; Contract No. N00014-68-A-0496; Grant No. NIH-5-R01-AM-12019-04.

A72-44370 Sonic boom effects on sleep - A field experiment on military and civilian populations. R. Rylander, S. Sorensen and K. Berglund (Kungl. Karolinska Institutet; National Environment Protection Board, Dept. of Environmental Health, Stockholm, Sweden). *Journal of Sound and Vibration*, vol. 24, Sept. 8, 1972, p. 41-50. 8 refs. Research supported by the Bank of Sweden Tercentary Fund.

A72-44376 The photopigment bleaching hypothesis of complementary after-images - A psychophysical test. J. M. Loomis (Michigan, University, Ann Arbor, Mich.). *Vision Research*, vol. 12, Oct. 1972, p. 1587-1594. 18 refs. NSF Grant No. GB-4947.

A72-44377 Localization and dynamic changes of glycogen in frog retina adapted to darkness or light. I, II. A. L. Shabadash and S. A. Shabadash (Academy of Sciences, Laboratory for Problems of the Control of Functions in Human and Animal Organisms, Moscow, USSR). *Vision Research*, vol. 12, Oct. 1972, p. 1595-1617. 86 refs.

A histochemical analysis of glycogen distribution in structures of frog retina was carried out according to the method of Shabadash (1947, 1949). Glycogen was demonstrated to be distributed in all retinal layers in conditions of dark adaptation and low temperature. The detection of glycogen suggests a metabolic adjustment of the junctional zones to perception and transmission of signal information. Physiological stimulation of frog retina with constant or flickering electric light is not accompanied by a uniform overall diminution or resynthesis of glycogen; the main consequences of such stimulation are manifested in the differential redistribution of glycogen in particular structures. F.R.L.

A72-44378 Perimetry - The information theoretical basis for its automation. P. Koch, A. Roulier, and F. Fankhauser (Universitäts-Augenklinik, Berne; Eidgenössischer Amt für Mass und Gewicht, Wabern, Switzerland). *Vision Research*, vol. 12, Oct. 1972, p. 1619-1630. 11 refs. Research supported by the Schweizerischer Nationalfonds zur Förderung der wissenschaftlichen Forschung; Grant No. NIH-EY-00232.

In a common form of perimetry short pulses of light are presented at various positions in the visual field of the patient, who has to indicate by 'yes' or 'no' whether he noticed the stimulus. The perimetrist determines the contrast of the stimulus which corresponds as closely as possible to the boundary between 'yes' and

'no.' The problem of communication between patient and perimetrist is considered in terms of information theory with the aim of finding criteria for the design of a largely automated system of perimetry for the acquisition and processing of data. The agreement of theoretical expectations and results obtained by patient simulation is satisfactory. It is shown that a memory of 8000 words is probably sufficient for a control computer in automated perimetry.

F.R.L.

A72-44379 Phase correlation between two sources formed on a diffusing surface - Application to the human retina (Correlation de phase entre deux sources formées sur une surface diffusante - Application à la rétine humaine). F. Berny (Institut d'Optique Théorique et Appliquée, Paris, France). *Vision Research*, vol. 12, Oct. 1972, p. 1631-1645. 23 refs. In French.

Experiments are described which are intended to characterize the roughness of the human retina in order to compare it with that of other surfaces re-emitting a luminous flux. The two extreme cases are the mirror (specular reflection) and the perfect diffuser (uniform diffuse reflection in all directions). The retinal structure being discontinuous, this diffusing surface can be simulated by the simple model of Goldfischer (1965) or Enloe (1967). An interferometry experiment is suggested which uses a measurement of the interference fringe contrast. The contrast is measured by studying the Fourier transform of the speckle pattern recorded photographically. The phases can be expressed using Gaussian, stationary statistics.

F.R.L.

A72-44380 Photopic and scotopic contributions to the human visually evoked cortical potential. B. R. Wooten (Brown University, Providence, R.I.). *Vision Research*, vol. 12, Oct. 1972, p. 1647-1660. 32 refs.

A72-44381 On a long-term temporal aspect of stereoscopic depth sensation. L. Ronchi and A. Mariani (Istituto Nazionale di Ottica, Arcetri, Italy). *Vision Research*, vol. 12, Oct. 1972, p. 1661-1667. 19 refs.

The time decay of stereoscopic depth perception after occlusion of one eye is investigated. The target consists of two point sources in a dark environment. When relative depth is well above the stereoscopic threshold, and a clear-cut sensation of depth has been reported, the abrupt occlusion of one eye is followed by the time decay of this sensation, which covers a number of seconds. The parameters that play the major role are found to be the inspection time in binocular vision and the relative depth. It is suggested that the total decay time might represent an estimate of relative depth sensation resulting from a long term interaction between disparity cues and the information gained by virtue of spontaneous fluctuation of accommodation.

F.R.L.

A72-44382 A component analysis of the electroretinogram. B. Knave, A. Moller, and H. E. Persson (Kungl. Karolinska Institutet, Stockholm, Sweden). *Vision Research*, vol. 12, Oct. 1972, p. 1669-1684. 43 refs. Research supported by the Fylgia 80-year Foundation for Scientific Research; Swedish Medical Research Council Grants No. B72-14X-3119-02; No. B72-14X-3564-01A.

A technique for corneal recording of the ERG in chronic experiments, which was shown to give constant amplitude values in long-term experiments, was combined with the averaging technique, and applied to record low-intensity ERG's in sheep. Results suggest that the ERG consists of five basic components: the rod and cone receptor potentials, a negative and a positive dc response from the inner nuclear layer, and a late slow positive response, corresponding to the conventional c-wave at higher stimulus intensities. It is suggested that the b-wave results from an integration of the receptor and dc responses, being mainly built up by the positive dc response. It is also suggested that the leading edge of the a-wave represents the initial phase of the cone receptor potential.

F.R.L.

A72-44383 Sensitivity of the human ERG and VECP to sinusoidally modulated light. C. E. Sternheim (Maryland, University, College Park, Md.) and C. R. Cavonius. *Vision Research*, vol. 12, Oct. 1972, p. 1685-1695. 25 refs. NSF Grant No. GB-4260; Grant No. PHS-NS-06877.

Human electroretinogram (ERG) and visual evoked cortical potential (VECP) responses were elicited with a square-wave grating stimulus in which adjacent bars were sinusoidally modulated 180 deg out of phase. Both the shape and absolute sensitivity of the high frequency portion of the human VECP transfer function resemble the observer's psychophysical sensitivity when it is measured with the same patterned stimulus. The ERG does not resemble either of the other responses since its sensitivity decreases less rapidly as stimulus frequency is increased, and an ERG response can be detected at frequencies that are too high to elicit a VECP or to be perceived as flicker. If the ERG is a measure of activity in the visual pathway that transmits flicker information, the processes that determine the shape of the de Lange function are not complete at the level at which the ERG originates, but are largely complete at the site of the VECP.

F.R.L.

A72-44384 Line length detectors in the human visual system - Evidence from selective adaptation. K. Nakayama and D. J. Roberts (Newfoundland, Memorial University, St. John's, Newfoundland, Canada). *Vision Research*, vol. 12, Oct. 1972, p. 1709-1713. 12 refs. Medical Research Council of Canada Grant No. MA-4021.

An experiment is described which attempted to determine whether the human visual system contains detectors sensitive to line length. The basic procedure was to adapt the visual system to an unpatterned adapting field or to a field containing either of two high contrast moving gratings. The gratings had either long lines or short lines. The contrast threshold for seeing the short-line moving grating was then obtained after each adaptation period. It appears that there are detectors sensitive to line length, as is the case with cats and monkeys.

F.R.L.

A72-44385 Visual sensitivity in the region of chromatic borders. C. E. Sternheim, R. A. Glass, and J. V. Keller (Maryland, University, College Park, Md.). *Vision Research*, vol. 12, Oct. 1972, p. 1715-1724. 19 refs. Research supported by the University of Maryland; Grant No. NIH-EY-00539-01.

Visual sensitivity was measured using the increment threshold technique in retinal areas where there was a step-wise change from one monochromatic light to another, both lights being matched in luminance. The purpose was to compare spatial interactions in the chromatic and brightness channels of the visual system by determining the manner in which sensitivity to a small test field varies in the region of a chromatic as well as a luminance border. The results showed visual sensitivity is reduced in the region of the chromatic border. Underlying mechanisms, involving lateral neural interaction and modulation of receptor illumination as a result of eye movements, are discussed in relation to recent electrophysiological and psychophysical research.

F.R.L.

A72-44386 Perceptual latency as a function of stimulus onset and offset and retinal location. J. H. Lewis, W. P. Dunlap, and H. H. Matteson (Tulane University, New Orleans, La.). *Vision Research*, vol. 12, Oct. 1972, p. 1725-1731. 21 refs. Grant No. PHS-EY-00021-05.

A72-44387 Techniques for analysing differences in VERs: Colored and patterned stimuli. J. A. S. Kinney, C. L. McKay, A. J. Mensch, and S. M. Luria (U.S. Naval Material Command, Naval Submarine Medical Center, Groton, Conn.). *Vision Research*, vol. 12, Oct. 1972, p. 1733-1747. 22 refs.

Procedures for recording and analyzing visual evoked responses (VER's) were refined by assessing the interrelations between stimulus

parameter and methodology. Degree of patterning was selected as a stimulus parameter known to produce a large and reliable effect on the VER, while color was chosen as a parameter eliciting a much lesser and more controversial response. VER's obtained with both kinds of stimuli were analyzed by (1) statistical analysis of the amplitudes and latencies of the components of the VER's, and (2) an experimental technique for testing hypotheses concerning the underlying processes of the VER. This technique isolates the contribution of various underlying mechanisms to the VER by summing responses to one stimulus and subsequently subtracting the same number of responses to a stimulus which differs from the first in that one feature has been omitted. F.R.L.

A72-44388 **The light-capture area of a photoreceptor.** A. W. Snyder and M. Hamer (Australian National University, Canberra, Australia). *Vision Research*, vol. 12, Oct. 1972, p. 1749-1753. 15 refs.

It is shown that some of the light which passes outside a photoreceptor's boundaries, and generally is presumed to be ineffective as far as photodetection is concerned, is in fact absorbed by the visual photopigment in the photoreceptor. An Airy disk with a diameter 50% larger than that of the photoreceptor significantly increases the amount of light absorbed in comparison with an Airy disk of the same diameter as the receptor. F.R.L.

A72-44389 **Signal detection analysis of meridional variations to vertical and horizontal gratings.** D. O. Weitzman, J. M. Smith (Riverside Research Institute, New York, N.Y.), and R. Karasik (Temple University, Philadelphia, Pa.). *Vision Research*, vol. 12, Oct. 1972, p. 1755-1758. 10 refs.

A72-44390 **The organization of human colour vision at the central fovea.** K. H. Ruddock and G. J. Burton (Imperial College of Science and Technology, London, England). *Vision Research*, vol. 12, Oct. 1972, p. 1763-1769. 20 refs. Research supported by the Science Research Council.

An experimental investigation is described to test alternative explanations of foveal small-field tritanopia. At least three classes of receptor mechanism contribute to dichromatic color matches established for centrally fixated bipartite fields of diam 15 to 20 min. Small-field tritanopia of the central fovea is not simply the result of spatial coarseness of one or more of the neural channels. The experimental results require that dichromatic vision of the central fovea is associated with divariant organization of the post-receptoral neural color channels. F.R.L.

A72-44450 * **Lactate dehydrogenase from an extremely thermophilic bacillus.** A. Weerkamp (Nijmegen, Katholieke Universiteit, Nijmegen, Netherlands) and R. D. MacElroy (NASA, Ames Research Center, Exobiology Div., Moffett Field, Calif.). *Archiv für Mikrobiologie*, vol. 85, 1972, p. 113-122. 15 refs.

A72-44557 **Motion parallax and absolute distance.** S. H. Ferris (U.S. Naval Material Command, Naval Submarine Medical Research Laboratory, Groton, Conn.). *Journal of Experimental Psychology*, vol. 95, Oct. 1972, p. 258-263. 13 refs. Navy-supported research.

The accuracy of absolute distance estimation based on monocular motion parallax was determined both before and after specific training. With the usual distance information eliminated, subjects either held their heads stationary or rhythmically rotated their heads about a vertical axis while judging the distance of stimuli placed 1.22-4.57 m. away. Although distance perception was poor before training, head movement produced more accurate judgments than head fixed. After only 10 training trials, accurate judgments based on

motion parallax were obtained. Results with a white background were as good as with a textured background when subjects were given direct information about motion parallax. (Author)

A72-44558 **Display size and the distribution of search times.** I. T. Kaplan (City College, New York, N.Y.), W. Metlay, and C. T. Lyons (Hofstra University, Hempstead, N.Y.). *Journal of Experimental Psychology*, vol. 95, Oct. 1972, p. 334-336. 8 refs. Research supported by Hofstra University; Grant No. PHS-EY-00384.

The time required to find targets on a visual display was investigated by varying the number of targets and the total number of items on the display. The items were three-digit numbers, randomly arrayed, and the targets were those numbers whose digits summed to 14. Display size varied from 50 to 200 items, and the number of targets varied from 2 to 10. For each display condition, the cumulative distribution of search times was negatively accelerated and could be fitted by an exponential equation. The slope parameter of the fitted curve was independent of the number of targets, but was inversely proportional to the total number of items on the display. The shape of the distribution and its dependence on the number of display items were derived from a mathematical model. (Author)

A72-44559 **Analysis of intracavitary electrocardiograms through a saline bridge in the diagnosis of cardiac arrhythmias.** M. H. Trujillo, A. Castillo, E. Cavallin, J. Mamán, J. I. Pazos, and T. Sheinfeld (University Hospital, Caracas, Venezuela). *American Heart Journal*, vol. 84, Oct. 1972, p. 451-455. 12 refs.

A72-44560 **The scoliosis of congenital heart disease.** C. E. Jordan, R. I. White, Jr., K. C. Fischer, C. Neill, and J. P. Dorst (Johns Hopkins Medical Institutions, Baltimore, Md.). *American Heart Journal*, vol. 84, Oct. 1972, p. 463-469. 17 refs.

Scoliosis occurs in approximately three per cent of the population. A study involving 129 patients was conducted to obtain information concerning the pattern of scoliosis development and the age when scoliosis begins. It was found that approximately one in ten acyanotic patients had a spinal curvature greater than ten degrees, while three in ten cyanotic patients had a similar curve. Curves beginning before six years of age were more likely to progress to severe scoliosis than were those beginning after six years. No correlation was noted between the severity of the scoliosis and delayed bone maturation, hematocrit values, or the specific type of heart defect. G.R.

A72-44561 * **The first derivative of the carotid displacement pulse.** A. H. Khan (Tufts University, Boston, Mass.) and D. H. Spodick (Lemuel Shattuck Hospital; Tufts University; Boston University, Boston, Mass.). *American Heart Journal*, vol. 84, Oct. 1972, p. 470-477. 13 refs. Grant No. NGR-22-012-006.

The amplitude and time relationships of the carotid derivative in normal individuals and unselected cardiac patients is investigated together with the effects of different contraction strengths in patients with pulsus alternans and subjects challenged with isoproterenol and propranolol. Data regarding the relationship between the prejection period (PEP) and the ratio of peak to total amplitude of the carotid displacement pulse derivative are presented. It is found that cardiac abnormality tends to reduce the rate of rise of the carotid displacement pulse. The results obtained show that the PEP is a somewhat more sensitive index of the changes studied than the carotid displacement derivative. G.R.

A72-44562 **The effect of hypoxia on the coronary blood flow in reserpinized dogs.** T. Koyama and K. Nakagawa (Hokkaido University, Sapporo, Japan). *American Heart Journal*, vol. 84, Oct. 1972, p. 487-495. 21 refs.

An attempt has been made to distinguish between the direct effect of hypoxemia and the actions of catecholamines. Coronary blood flow has, therefore, been measured in reserpinized dogs, in which the effects both of catecholamines and of the sympathetic nerves are thought to disappear. It was found that the uncontrolled heart rate was increased by hypoxemia even in reserpinized dogs. In this case the coronary vasodilatory effect of hypoxemia could not be distinguished from the effect of the increased heart rate on the coronary blood flow, since tachycardia also caused an increase in coronary blood flow. In other experiments the heart rate was, therefore, kept constant by use of a pacemaker. It was seen that even at a constant heart rate the coronary blood flow was significantly increased by hypoxemia.

G.R.

A72-44563 **Animal studies of effect of chronic exercise on the heart and atherosclerosis - A review.** V. F. Froelicher (Alabama, University, Birmingham, Ala.; USAF, Washington, D.C.). *American Heart Journal*, vol. 84, Oct. 1972, p. 496-506. 67 refs.

The studies discussed are related to myocardial hypertrophy, myocardial histological changes, coronary artery size changes, coronary collateral circulation, and cardiac mechanical and metabolic performance. Other investigations considered are concerned with skeletal muscle mitochondria and respiratory enzyme changes, myocardial mitochondria and respiratory enzyme changes, and atherosclerosis and serum cholesterol. It is pointed out that the animal studies regarding the effect of chronic exercise on atherosclerosis are suggestive of a protective influence. However, the results obtained are not conclusive, particularly with regard to the coronary arteries.

G.R.

A72-44575 **Ensemble characteristics of the human visual evoked response - Periodic and random stimulation.** D. G. Childers, N. W. Perry, Jr. (Florida, University, Gainesville, Fla.), T. C. Doyle (U.S. Army, Medical Research and Development Command, Washington, D.C.), and A. G. Brinck (ENTEL-CHILE, Chile). *IEEE Transactions on Biomedical Engineering*, vol. BME-19, Nov. 1972, p. 408-415. 29 refs. Grants No. NIH-EY-00581; No. NIH-EY-00077.

A72-44586 # **Problem of the 'behavior' of visceral systems (K probleme 'povedeniia' vistseral'nykh sistem).** V. N. Chernigovskii and P. K. Klimov (Akademiia Nauk SSSR, Institut Fiziologii, Leningrad, USSR). *Fiziologicheskii Zhurnal SSSR*, vol. 58, May 1972, p. 629-638. 38 refs. In Russian.

The concept of behavior is usually associated by physiologists with those actions of the organism that ensure most complete adaptation to the ambient medium. These actions are primarily identified with various motor functions, but the concept of behavior should in fact encompass a wider range of processes. An attempt is made to formulate such a wide concept of behavior for visceral systems. Various criteria are defined which can be used to evaluate the usefulness of the concept of behavior in adequately describing the activity of visceral systems. Experimental data on the behavior of the digestive system are used to substantiate the proposed definitions.

T.M.

A72-44587 # **Elaboration of steady changes in the firing rate of cortical neuron populations (Vyrabotka ustoychivyykh izmenenii chastoty razriadov korkovykh neironnykh populiatsii).** N. N. Vasilevskii, N. B. Suvorov, and V. V. Trubachev (Akademiia Meditsinskikh Nauk SSSR, Leningrad, USSR). *Fiziologicheskii Zhurnal SSSR*, vol. 58, May 1972, p. 639-646. 19 refs. In Russian.

Steady increases and decreases in the firing rate of cortical neuron populations in immobilized rabbits were achieved with the aid of a feedback experiment where pulsed electrical stimulation of the skin was automatically applied when the measured firing rate exceeded threshold values. Changes in the firing rate were always directed away from the applied stimulus frequency. The resulting

drop or rise in the firing rate was maintained for 15 to 20 min after termination of the skin stimulus.

T.M.

A72-44588 # **Characteristics of the background activity of hypothalamus neurons (K kharakteristike fonovoi aktivnosti neironov gipotalamusa).** A. G. Arakelian and O. G. Baklavadzhian (Akademiia Nauk Armianskoi SSR, Institut Fiziologii, Yerevan, Armenian SSR). *Fiziologicheskii Zhurnal SSSR*, vol. 58, May 1972, p. 679-685. In Russian.

Glass microelectrodes were used for extracellular recording of spontaneous unit activity of the supramammillary, mammillary, and anterior hypothalamic regions in cats anesthetized with chloralose and immobilized with ditiline. The background activity of most hypothalamic neurons is characterized by single nonrhythmic spikes with large interspike intervals. Brief bursts of discharges were most frequently (36.3% of neurons) observed in the mammillary region. No specific distribution of interspike intervals among the separate hypothalamic structures was observed, and no significant differences in the frequency characteristics of neurons in the different regions were evident.

T.M.

A72-44589 # **Influence of the sympathetic nervous system on the presynaptic inhibition of the dorsal surface potential of the spinal cord (O vlianii simpaticheskoi nervnoi sistemy na presinapticheskoe tormozhenie potentsiala dorsal'noi poverkhnosti spinnogo mozga).** P. E. Motsnyi and M. A. Bagamova (Meditsinskii Institut, Dnepropetrovsk, Ukrainian SSR). *Fiziologicheskii Zhurnal SSSR*, vol. 58, May 1972, p. 697-701. 13 refs. In Russian.

A72-44590 # **Influence of the nervous system and its mediators on the spontaneous contractile activity of a smooth muscle (O vlianii nervnoi sistemy i ee mediatorov na spontannuiu sokratitel'nuu aktivnost' gladkoi myshtsy).** V. V. Dulinets (I Leningradskii Meditsinskii Institut, Leningrad, USSR). *Fiziologicheskii Zhurnal SSSR*, vol. 58, May 1972, p. 707-711. 12 refs. In Russian.

A72-44591 # **Changes in certain hemodynamic indices during muscular strain in people with differing capacity to perform work (Izmeneniia nekotorykh pokazatelei gemodinamiki pri myshechnoi nagruzke u liudei s raznoi rabotosposobnost'iu).** P. P. Ozolin' and E. B. Portsik (Latviiskii Nauchno-Issledovatel'skii Institut Eksperimental'noi i Klimicheskoi Meditsiny, Riga, Latvian SSR). *Fiziologicheskii Zhurnal SSSR*, vol. 58, May 1972, p. 716-721. 14 refs. In Russian.

A72-44592 # **Role of the dorso-medial area of the posterior hypothalamus in thermal regulation and its functional relationships with the anterior hypothalamus (O roli dorsomedial'noi oblasti zadnego gipotalamusa v termoregulatsii i funktsional'nye vzaimootnosheniia ee s perednim gipotalamusom).** K. P. Ivanov and A. M. Usacheva (Akademiia Nauk SSSR, Institut Fiziologii, Leningrad, USSR). *Fiziologicheskii Zhurnal SSSR*, vol. 58, May 1972, p. 729-736. 20 refs. In Russian.

A72-44593 # **Analysis of changes in thermal regulation after destruction of the medial preoptic area of the hypothalamus (K analizu izmenenii termoregulatsii posle razrusheniia medial'noi preopticheskoi oblasti gipotalamusa).** A. M. Usacheva (Akademiia Nauk SSSR, Institut Fiziologii, Leningrad, USSR). *Fiziologicheskii Zhurnal SSSR*, vol. 58, May 1972, p. 737-742. 22 refs. In Russian.

A72-44594 # **Pulse activity of neurons in the thermal regulation center of the anterior hypothalamus during chill shivering (Impul'snaia aktivnost' neironov termoregulatsionnogo tsentra perednego gipotalamusa vo vremia khodolodvoi drozhi).** V. A. Kon-

stantinov (Akademii Nauk SSSR, Institut Fiziologii, Leningrad, USSR). *Fiziologicheskii Zhurnal SSSR*, vol. 58, May 1972, p. 743-749. 17 refs. In Russian.

A72-44595 # Influence of elevated partial oxygen pressure on the sympathetic-adrenal and acetyl-choline systems (Vliianie povyshennogo partial'nogo davleniia kisloroda na simpatoadrenalovuiu i atsetilkholinovuiu sistemy). N. S. Ereemeev, G. V. Troshikhin, and V. G. Shaliapina (Akademii Nauk SSSR, Institut Fiziologii, Leningrad, USSR). *Fiziologicheskii Zhurnal SSSR*, vol. 58, May 1972, p. 768-772. 25 refs. In Russian.

A72-44596 # Quantitative evaluation of the kinetics of free-radical processes in animal organs under hypoxic conditions (Kolichestvennaia otsenka kinetiki svobodnoradikal'nykh protsessov v organakh zhivotnykh v usloviakh gipoksii). I. A. Maksimova, V. M. Maksimov, and L. A. Piruzian (Akademii Nauk SSSR, Institut Khimicheskoi Fiziki, Moscow, USSR). *Fiziologicheskii Zhurnal SSSR*, vol. 58, May 1972, p. 773-778. 6 refs. In Russian.

A72-44597 # Possibility of determining the lung ventilation volume by the mathematical modeling method (O vozmozhnosti opredeleniia ventiliruemoi ob'ema legkikh metodom matematicheskogo modelirovaniia). A. B. Kiriukhin and N. N. Kanaev (Ministerstvo Zdravookhraneniia SSSR, Vsesoiuznyi Nauchno-Issledovatel'skii Institut Pul'monologii, Leningrad, USSR). *Fiziologicheskii Zhurnal SSSR*, vol. 58, May 1972, p. 788-792. 12 refs. In Russian.

A72-44598 # Determination of the diffusional capability of lungs by the method of delayed respiration (Opredelenie difuzionnoi sposobnosti legkikh metodom zaderzhki dykhaniia). G. P. Gurina (Ministerstvo Zdravookhraneniia SSSR, Vsesoiuznyi Nauchno-Issledovatel'skii Institut Pul'monologii, Leningrad, USSR). *Fiziologicheskii Zhurnal SSSR*, vol. 58, May 1972, p. 793-795. 13 refs. In Russian.

A72-44599 Physiology of respiration (Physiologie der Atmung). J. Piiper. In: *Respiration*. Munich, Urban und Schwarzenberg, 1972, p. 1-161. 58 refs. In German.

A detailed study is made of the mechanisms of gas exchange in the lungs and in the tissues. Among the topics discussed are the pulmonary ventilation resulting from changes in lung volume achieved by respiration muscles, the gas exchange between lung alveoles and lung capillaries resulting from diffusion, the transport of respiration gases from the lung capillaries to the body capillaries by blood circulation, the gas exchange by diffusion between the body capillaries and tissues or cells, and the oxidative cell metabolism involving the uptake of oxygen, the formation of carbon dioxide, and the liberation or storage of energy. Also considered is the role of buffering in maintaining the carbon dioxide balance and carbon dioxide transport in the blood, and the homeostasis of the hydrogen ions in the body as a result of the metabolism, the chemical buffer systems, the pulmonary ventilation, and the kidney functions is described. A.B.K.

A72-44600 Respiration control (Atmungsregulation). H.-P. Koepchen. In: *Respiration*. Munich, Urban und Schwarzenberg, 1972, p. 163-308. 213 refs. In German.

A study is made of the mechanisms of respiration control which ensure simultaneous adaptation of the organism to power requirements and the maintenance of an adequate chemical environment in the tissues. The results of experiments on animals to determine the location of the hypothetical respiration center in the lower brain

stem are summarized, as well as a number of theories concerning the formation of the respiration rhythm. The physiology of the efferent innervation of the respiratory apparatus is reviewed, as well as mechanisms of autonomous control of the respiratory apparatus by nerve reflexes. The adaptation of respiration to metabolism is discussed, and a detailed analysis is made of the respiration driving mechanisms, including so-called unspecific respiration drives, respiration effects resulting from blood chemistry (feedback drives), and respiration drives resulting from active muscles and moving extremities. The relation between respiratory drives transmitted by the nerves from working muscles and local chemoreception is discussed, as well as the existence of a central chemoreception which is sensitive to both changes in carbon dioxide pressure and changes in the hydrogen ion concentration in the arterial blood. A.B.K.

A72-44774 * The state of water in muscle tissue as determined by proton nuclear magnetic resonance. R. Cooke (California, University, San Francisco, Calif.) and R. Wien (Stanford University, Stanford, Calif.). *Biophysical Journal*, vol. 11, Dec. 1971, p. 1002-1017. 36 refs. Research supported by Stanford University; NSF Grants No. GB-16890; No. GM-12776; No. GP-23406; Grants No. NIH-GM-14752; No. NIH-GM-14076; No. NGL-05-020-250.

A72-44823 # Changes in the pituitary-thyroid and in the pituitary-gonad systems under conditions of functional loading and of physiological immobilization. D. M. Mateeff, S. Kh. Milanov, G. I. Dashev, D. I. Ionkov, and I. G. Tsacheva (Institut za Spetsialisti i Us'v'rshenstvuvane na Lekari; B'lgarska Akademiia na Naukite, Institut po Fiziologiya, Sofia, Bulgaria). *Bolgarskaia Akademiia Nauk, Doklady*, vol. 25, no. 7, 1972, p. 995-998. 10 refs.

A72-44824 # Experimental studies on the alkali-acid equilibrium in the blood gases under the chronic action of low concentrations of lead. S. N. Bozhkov, E. I. Ianev, I. Kh. Mandadzhiev, and T. I. Dimitrov (Institut za Spetsialisti i Us'v'rshenstvuvane na Lekari; Vissh Meditsinski Institut, Sofia, Bulgaria). *Bolgarskaia Akademiia Nauk, Doklady*, vol. 25, no. 7, 1972, p. 1011-1014. 10 refs.

A72-44869 * Electron microscopy - A glimpse into the future. H. Fernández-Morán (Chicago, University, Chicago, Ill.). *New York Academy of Sciences, Annals*, vol. 195, June 20, 1972, p. 376-389. 57 refs. Research supported by the Spastic Paralysis Research Foundation, Pritzker Fund, L. Block Fund, and University of Chicago; Grants No. NIH-GM-13243; No. NIH-GM-18236; No. NGL-14-001-012.

A forecast attempt is presented on future advances in electron microscopic studies of membrane systems. A review of recent advances and present trends is followed by a discussion of prerequisites to further progress. Special attention is given to research areas of particular promise. M.V.E.

A72-44906 Eye movements evoked by collicular stimulation in the alert monkey. D. A. Robinson (Johns Hopkins University, Baltimore, Md.). *Vision Research*, vol. 12, Nov. 1972, p. 1795-1808. 28 refs. Grant No. PHS-EY-0598.

The investigations were conducted to extend Apter's findings (1945, 1946) to the alert primate. Three young rhesus monkeys were used in the experiments. It was to be observed what type of movements stimulation produced and how these movements varied from one location to another in the superior colliculus. Aspects of spatio-temporal interaction were also investigated. G.R.

A72-44907 Optical directionality of retinal receptors and corresponding points. I - Nasal-temporal asymmetry of retinal spatial values and orientation of receptors: Are the corresponding points cones. II - Variation of form of the experimental horoptera, and

possibility of reorganization of the retinal correspondence according to the orientation of the eyes (Directionnalité optique des récepteurs rétiniens et points correspondants. I - Asymétrie nasale-temporale des valeurs spatiales rétiniennes et orientation des récepteurs: Les points correspondants sont-ils des cones. II - Variations de forme de l'horoptère expérimental, et possibilité de réorganisation de la correspondance rétinienne selon l'orientation des yeux). C. Bourdy (Muséum National d'Histoire Naturelle, Laboratoire de Physique Appliquée aux Sciences Naturelles, Paris, France). *Vision Research*, vol. 12, Nov. 1972, p. 1815-1839. 59 refs. In French.

A72-44908 Functional organization of the periphery effect in retinal ganglion cells. H. Ikeda and M. J. Wright (Royal College of Surgeons of England, London, England). *Vision Research*, vol. 12, Nov. 1972, p. 1857-1879. 32 refs. Research supported by the Medical Research Council and Godfrey Robinson Research Fund.

An investigation was conducted in order to define spatial and temporal parameters of the periphery effect, and to determine the relation between the periphery effect and independent measures of the receptive field organization of the retinal ganglion cell. Adult cats were used in the tests. The periphery effect was investigated in 15 cells which had previously been subjected to a thorough exploration of the receptive field properties. A classification of the periphery effect is discussed together with the phenomena observed in the unmodulated components of the periphery effect. G.R.

A72-44909 * The suppression-recovery effect in relation to stimulus repetition and rapid light adaptation. W. L. Salinger and D. B. Lindsley (California, University, Los Angeles, Calif.). *Vision Research*, vol. 12, Nov. 1972, p. 1897-1905. 20 refs. Grants No. PHS-NS-8552; No. NGL-05-007-049; Contract No. N00014-69-A-0200-4024.

A72-44910 The effects of simultaneous and successive contrast on perceived brightness. F. L. Kitterle (Florida State University, Tallahassee, Fla.). *Vision Research*, vol. 12, Nov. 1972, p. 1923-1931. 25 refs.

An experiment was conducted to investigate the effects of inducing field area and luminance on the perceived brightness of a test stimulus presented either simultaneously with the inducing field or successively at various times after the offset of the inducing field. A second experiment was concerned with the effects of separation between the test and inducing fields, on the temporal course of successive brightness contrast. The results obtained in the experiments indicate that similar principles apply to both simultaneous and successive brightness contrast. G.R.

A72-44916 Sonic boom startle - A field study in Meppen, West Germany. D. N. May (Southampton, University, Southampton, England). *Journal of Sound and Vibration*, vol. 24, Oct. 8, 1972, p. 337-347. 41 refs. Research supported by the Ministry of Technology.

A field experiment was conducted to relate the subjectively-reported startle of up to 39 subjects exposed to up to 53 sonic booms to simple functions of their overpressures and rise times. The analysis, which included a forward selection procedure for improved regression, produced prediction equations which, on the substitution of these comparatively easily derived boom parameters, report startle on a ratio scale in which a value of 10 jumps is the startle due to an imaginary, unexpected, fairly loud door-slam. The startle due to Concorde sonic booms is assessed with these equations. Conclusions are also drawn about their functional significance and their relation to sonic boom loudness. (Author)

A72-44924 # Comparison of the vectors of the ventricular depolarization and repolarization of man during immersion in a standing position (Comparaison des vecteurs de la dépolarisation et

de la repolarisation ventriculaires de l'homme lors de son immersion en position debout). J. Boland, J. Troquet, and J. P. Bleus (Institut Henrijean, Spa; Liège, Université, Liège, Belgium). *Société Royale des Sciences de Liège, Bulletin*, vol. 41, no. 3-4, 1972, p. 188-194. 10 refs. In French. Research supported by Spa-Monopole.

A72-44957 Relative position of the rib within the chest and its determination on living subjects with the aid of a computer program. J. Jordanoglou, C. Gardikas (Evangelismos Hospital, Athens, Greece), and J. Kontos (Evangelismos Hospital; Greek Atomic Energy Commission, Computer Centre, Athens, Greece). *Respiration Physiology*, vol. 16, Sept. 1972, p. 41-50. 6 refs.

A72-44958 The reflex and mechanical response of the inspiratory muscles to an increased airflow resistance. R. Shannon and F. W. Zechman (Kentucky, University, Lexington, Ky.). *Respiration Physiology*, vol. 16, Sept. 1972, p. 51-69. 25 refs. Grants No. NIH-HE-10628; No. NIH-GM-00800; Contract No. F33615-67-C-1370.

Results of experiments performed on cats to determine the functional role of each source of proprioceptive information (chest wall, diaphragm, and lungs) by systematically interrupting the appropriate afferent pathways, singly and in combination, are described. When all sources of sensory feedback were interrupted simultaneously, the facilitation of external intercostal and diaphragm unit activity observed with loading was totally abolished. This preparation also made it possible to study the extent to which the intrinsic properties of the inspiratory muscles contribute to the systems mechanical response to increased airflow resistance. The primary function of the 'load-compensating' reflex when breathing against increased airflow resistance appears to be one of providing stability in the rib cage. F.R.L.

A72-44959 First-breath response of medullary inspiratory neurones to the mechanical loading of inspiration. R. Shannon, F. W. Zechman, and D. T. Frazier (Kentucky, University, Lexington, Ky.). *Respiration Physiology*, vol. 16, Sept. 1972, p. 70-78. 13 refs. Research supported by the Tobacco and Health Research Institute; Grant No. NIH-HE-10628; Contract No. F33615-67-C-1370.

Experiments have been conducted to investigate whether electrical activity of medullary inspiratory neurones is altered on the first breath following mechanical loading of inspiration. The predominant effect of resistive loading was an increase in both rate and duration of neurone activity. This facilitation was completely eliminated by vagotomy suggesting that the vagi are the only source of sensory information impinging on the inspiratory neurones conveying information about the loaded breath. In the intact animal, elastic loading and tracheal occlusion elicited the following responses: (1) an extended firing time of all neurones, (2) increased rate of unit activity in one population of neurones, and (3) a decreased rate of unit activity in another population of neurones. Following vagotomy the only response noted with these types of loading was a decrease in the firing rate of some neurones. A probable source of the observed inhibition are the tendon organs of the diaphragm and/or external intercostal muscles via dorsal root pathways. (Author)

A72-44960 Comparison of three methods for quantitating respiratory response to hypoxia in man. R. Kronenberg, F. N. Hamilton, R. Gabel, R. Hickey, D. J. C. Read, and J. Severinghaus (California, University, San Francisco, Calif.). *Respiration Physiology*, vol. 16, Sept. 1972, p. 109-125. 20 refs. Grants No. NIH-HE-06285; No. NIH-GM-15571.

Three methods of quantitating the respiratory response to acute hypoxia were compared in nine normal young men: (1) steady state CO₂ response at oxygen partial pressures of 200 and 40 torr, (2) progressive hypoxia with CO₂ arterial pressure held at the subjects resting value and 5 torr above this, and (3) a single breath test which

uses a single vital capacity inspiration of a hypoxic and/or hypercapnic gas and is presumed to stimulate primarily peripheral chemoreceptors. In methods 1 and 2 the ventilatory response to hypoxia (defined as the increment in ventilation produced by reduction of alveolar oxygen pressure from above 200 to 40 torr measured at the subjects' normal or standardized arterial CO₂ pressure) averaged 19.9 and 20.9 L(min x sq m). Ventilation (mean of second and third spontaneous breaths) following a single vital capacity breath of 15% CO₂ in N₂ averaged 30.3 L(min x sq m) more than after a control breath of 5% CO₂ in O₂. Hypoxic depression of ventilation occurred in three subjects during testing with method 1 and in one subject with method 2. (Author)

A72-45009 Control, by the visual cortex, of the posterior lateral thalamic group in the cat (Contrôle, par le cortex visuel, du groupe thalamique latéral postérieur chez le chat). D. Richard, P. Buser (Paris, Université, Laboratoire de Neurophysiologie Comparée, Paris, France), and L. Angián. *Experimental Brain Research*, vol. 15, Sept. 29, 1972, p. 386-404. 45 refs. In French. Research supported by the Fondation pour la Recherche Médicale Française.

A72-45010 Clinicoarteriographic correlations in angina pectoris with and without myocardial infarction. R. S. Cosby, J. A. Giddings, J. R. See, and M. Mayo (Pasadena Cardiovascular Research Foundation; Huntington Memorial Hospital, Pasadena, Calif.). *American Journal of Cardiology*, vol. 30, Oct. 1972, p. 472-475. 9 refs.

In a study of 30 consecutive patients who underwent coronary arteriography for prolonged, severe angina, 15 had a history or electrocardiographic evidence of prior myocardial infarction and 15 did not. The frequency of intercoronary circulation and the presence of a rudimentary vessel distinguished the group with infarction, whereas the presence of focal bridging alone was characteristic of those with angina pectoris. The thesis is offered that angina is the result of proximal major vessel stenosis, with inadequate service by collateral circulation, and that the findings with infarction although quantitatively similar, result eventually in complete obstruction, often with retrograde flow in a major vessel. Such a working hypothesis suggests that minor degrees of myocardial damage are explicable in terms of major vessel constriction with resultant injury at the subendocardial level. (Author)

A72-45011 General index for the assessment of cardiac function. I. Mirsky, A. Pasternac, and R. C. Ellison (Children's Hospital Medical Center; Harvard University, Boston, Mass.). *American Journal of Cardiology*, vol. 30, Oct. 1972, p. 483-491. 39 refs. Research supported by the Children's Hospital Medical Center and Massachusetts Heart Association; Grants No. NIH-HE-12711-02; No. NIH-HE-10436-05.

A general approach is proposed for the assessment of cardiac function with the aid of the concept of 'normalized velocity.' This concept arises from the observation that the mechanical behavior of heart muscle can best be described in terms of exponential stress-strain characteristics similar to those of other biological elastic tissues. This concept is extended in the clinical situation to apply to variations in ventricular volume and to variations in precordial displacement as recorded by the apex cardiogram. The assessment of myocardial contractility is discussed together with a biplane angiographic analysis. G.R.

A72-45112 # New cancer therapy treatment techniques using space dosimetric concepts. L. F. Wailly, J. W. Watters, and P. B. Carter (U.S. Air Force Academy, Colorado Springs, Colo.). *International Astronautical Federation, International Astronautical Congress, 23rd, Vienna, Austria, Oct. 8-15, 1972, Paper. 6 p.*

The index of health is an important concept in connection with

the decision by the physician to treat a cancer patient with a massive dose of radiation. Data regarding the index of health can provide the assurance that the adverse effect of the radiation treatment can be tolerated by the patient. The index of health is calculated on the basis of tests involving five blood samples taken at intervals ranging from twelve to eighteen hours after an injection of glycine or lysine which is tagged with radioactive carbon. Another advance concerning the treatment of cancer provides a means for defining and measuring the radiation dose absorbed by the patient with great accuracy. G.R.

A72-45118 # Experimental development of a method for long-term implantation of plastic catheters in different sections of the cardiovascular system (Eksperimental'naia razrabotka metoda dlitel'noi implantatsii plastikovykh kateterov v razlichnye otdely serdechno-sosudistoi sistemy). B. B. Egorov, A. N. Nazin, and O. P. Buadze. *International Astronautical Federation, International Astronautical Congress, 23rd, Vienna, Austria, Oct. 8-15, 1972, Paper. 7 p.* In Russian.

A72-45120 # Expired air as a source of spacecraft environment carbon monoxide contamination (Znachenie vydykhaemogo vozdukh kak istochnika zagryazheniya okis'iu ugleroda sredy kosmicheskikh korablei). Iu. G. Nefedov, V. P. Savina, and N. L. Sokolov. *International Astronautical Federation, International Astronautical Congress, 23rd, Vienna, Austria, Oct. 8-15, 1972, Paper. 6 p.* In Russian.

It is shown that the expired air can contain both endogenous and exogenous carbon monoxide, whose concentration depends strongly on the microclimatic parameters of the atmosphere, the time of contact of man with carbon monoxide containing air, the degree of activity, the type of nutrition, and also on the individual characteristics of the organism. The daily excretion of carbon monoxide by a healthy person is 200 mg (at rest, without the influence of any external factors). The rate of carbon monoxide excretion increases rapidly in the presence of extremal factors. This should be taken into consideration when designing space-vehicle air purification systems. Experiments lasting 30 days showed, however, that carbon monoxide concentrations of the order of 15 mg/cu m do not affect the principle physiological systems of the organism. V.P.

A72-45121 # The problem of decontaminating and preserving drinking water in spacecraft water supply systems (Problema obezrazhivaniia i konservatsii pit'evoi vody v sistemakh vodoobespecheniia kosmicheskikh korablei). S. V. Chizhov, Z. P. Pak, N. N. Sitnikova, and Iu. S. Koloskova. *International Astronautical Federation, International Astronautical Congress, 23rd, Vienna, Austria, Oct. 8-15, 1972, Paper. 10 p.* In Russian.

An investigation of various water preservation methods shows that preference should be given to preservation by means of electrolytic solutions containing silver ions in the liquid or solid phase. This method is particularly well suited in the case of regenerated water. The combined use of physical and chemical decontamination methods is discussed. V.P.

A72-45127 # Current position on CETI from the viewpoint of biology (Sovremennoe polozhenie CETI s tochkii zreniia biologii). L. M. Mukhin. *International Astronautical Federation, International Astronautical Congress, 23rd, Vienna, Austria, Oct. 8-15, 1972, Paper. 10 p.* 15 refs. In Russian.

Biological aspects of communications with extraterrestrial intelligence (CETI) are examined in the general framework of the universal chemistry of life. An analysis of the distribution of main organogenic elements indicates that the composition of living matter is closer to that of the Universe as a whole rather than that of the Earth's crust. The properties of silicon are discussed to substantiate arguments against life based on this element instead of carbon. The possibility for the existence of life on wandering planets that are not

tied with any stellar body are examined in terms of expected ambient conditions and sources of energy. T.M.

A72-45128 # Some metabolic indices in subjects relative to nutrition in a one-year experiment (Nekotorye pokazateli obmena veshchestv u ispytatelei v svyazi s pitaniem v godichnom eksperimente). Iu. G. Nefedov, V. G. Vysotskii, A. I. Kochetkova, K. V. Smirnov, and A. S. Ushakov. *International Astronautical Federation, International Astronautical Congress, 23rd, Vienna, Austria, Oct. 8-15, 1972, Paper. 5 p.* In Russian.

Results of biological and physiological studies of the nourishment of three human subjects sustained by a food ration of dehydrated products during year-long confinement in a sealed chamber with a regenerative life support system. Mean daily consumption included 131.3 g of proteins, 125.1 g of fats, and 344.1 g of carbohydrates. Dehydrated products were reconstituted by adding water recovered from urine and from condensation in the chamber. Vitamins, minerals, and vegetable mixtures were included. Data for the protein, lipid, carbohydrate, vitamin, and water-salt metabolisms are discussed along with indices of hormone and enzyme functions. T.M.

A72-45131 # Comparative study of regional hemodynamics during tilt test and lower body negative pressure exposure. Kh. Kh. Iarullin, T. N. Krupina, T. D. Vasil'eva, and D. A. Alekseev. *International Astronautical Federation, International Astronautical Congress, 23rd, Vienna, Austria, Oct. 8-15, 1972, Paper. 6 p.*

Summary of the results of rheographic studies of cerebral, pulmonary, and peripheral hemodynamics in 24 healthy male test subjects exposed to tilt tests and lower body negative pressure (LBNP). LBNP is found to exert a greater effect on regional hemodynamics, particularly on cerebral hemodynamics, than tilt tests. M.V.E.

A72-45133 # A system of programs for life support system optimization in terms of a minimum reduced mass (Sistema programm dlia optimizatsii sistem zhizneobespecheniia po kriteriiu minimuma privedennoi massy). B. A. Adamovich and V. N. Sokolov (Akademiia Nauk SSSR, Moscow, USSR). *International Astronautical Federation, International Astronautical Congress, 23rd, Vienna, Austria, Oct. 8-15, 1972, Paper. 26 p.* 11 refs. In Russian.

Analysis of the quality of life support systems containing various subsystems. Graphs are used to evaluate the effectiveness of recycling techniques using various criteria. Special attention is given to reduced mass minimization as a quality criterion for the energy conversion and metabolic processes involved. A diagram is also given to show the mass transfer processes in a life support system. Life support systems containing different subsystems are compared and evaluated to provide a basis for sound selection of a suitable system. V.Z.

A72-45148 * # Application of planetary quarantine methodology and spacecraft sterilization technology to improved health care delivery. R. H. Green (California Institute of Technology, Jet Propulsion Laboratory, Environmental Requirements Section, Pasadena, Calif.). *International Astronautical Federation, International Astronautical Congress, 23rd, Vienna, Austria, Oct. 8-15, 1972, Paper. 12 p.*

In 1969 the Jet Propulsion Laboratory undertook an investigation to determine which of its space-derived capabilities could make significant contributions to the improvement of health care delivery in the U.S. The area of planetary quarantine was identified as one of high relevance. Two studies were conducted in this connection. The first study, which could contribute to infection reduction and control, was concerned with conversion of infection implicated complex, nonheat sterilizable equipment to dry heat, sterilizable equipment by changes in design and materials of construction. The

second study, area related to hospital acquired infection is clean room technology. A definite investigation has been performed to demonstrate and statistically evaluate performance under controlled conditions. G.R.

A72-45164 * # Progress in regenerative life support systems for a lunar laboratory. J. N. Pecoraro (NASA, Office of Manned Space Flight, Bioenvironmental Systems Div., Washington, D.C.) and F. K. Morris (United Aircraft Corp., Hamilton Standard Div., Windsor Locks, Conn.). *International Astronautical Federation, International Astronautical Congress, 23rd, Vienna, Austria, Oct. 8-15, 1972, Paper. 28 p.* 5 refs.

Research and development work for application of Environmental and Thermal Control/Life Support System (ETC/LSS) on a lunar base mission is reviewed, covering lunar mission requirements and constraints, a Lunar Base ETC/LSS reliability assessment, food regeneration, the water and waste system, the atmosphere regeneration subsystem, and atmosphere contaminant control. The establishment of detailed system design criteria for the Lunar Surface Base LSS is considered to be premature at this phase of the project. Some recommendations are given instead for guidance in further R & D efforts. V.Z.

A72-45183 * # Regeneration of oxygen from carbon dioxide and water. J. Weissbart, W. H. Smart (Applied Electrochemistry, Inc., Sunnyvale, Calif.), and T. Wydeven (NASA, Ames Research Center, Moffett Field, Calif.). *International Astronautical Federation, International Astronautical Congress, 23rd, Vienna, Austria, Oct. 8-15, 1972, Paper. 16 p.*

In a closed ecological system it is necessary to reclaim most of the oxygen required for breathing from respired carbon dioxide and the remainder from waste water. One of the advanced physico-chemical systems being developed for generating oxygen in manned spacecraft is the solid electrolyte-electrolysis system. The solid electrolyte system consists of two basic units, an electrolyzer and a carbon monoxide disproportionator. The electrolyzer can reclaim oxygen from both carbon dioxide and water. Electrolyzer preparation and assembly are discussed together with questions of reactor design and electrolyzer performance data. G.R.

A72-45193 * # The Space Station Prototype Program - The development of a regenerative life support system for extended-duration missions. N. C. Willis, Jr. (NASA, Manned Spacecraft Center, Houston, Tex.) and J. M. Neel (United Aircraft Corp., Hamilton Standard Div., Windsor Locks, Conn.). *International Astronautical Federation, International Astronautical Congress, 23rd, Vienna, Austria, Oct. 8-15, 1972, Paper. 19 p.*

Design concepts and test philosophies which may contribute to the development of a low-cost maintainable environmental control/life support system are examined. It is shown that the concept of producing flight prototype equipment during a developmental program can reduce the eventual cost of a flight system by incorporating realistic flight-type design requirements without imposing exacting design features and stringent controls. A flight prototype design is one that can be converted readily into an actual flight design without any conceptual change. Modularity of subsystems provides the system and the program a degree of flexibility relative to the eventual vehicle configuration and technological improvements. V.P.

A72-45199 # Induction of hemodynamic deterioration by the hypogravic state - An evaluation of mechanisms and prevention. K. H. Hyatt. *International Astronautical Federation, International Astronautical Congress, 23rd, Vienna, Austria, Oct. 8-15, 1972, Paper. 40 p.*

Bedrest weightlessness-simulation studies of 14 and 28 days were conducted on 20 and 24 healthy male subjects kept on metabolic diets in supine positions followed by placing in the 70 deg

tilt posture with or without performing a controlled Valsalva maneuver before tilting. Baseline EKG, heart rate, brachial and pulmonary artery pressure, cardiac output, and oxygen consumption were recorded during the experiments. Ten subjects received 9-alpha-fluorohydrocortisone during the bedrest phase to evaluate the effects of plasma volume maintenance on the changes in tilt and exercise tolerance induced by bedrest. It is concluded that factors other than autonomic insufficiency, extravascular dehydration, increased venous pulling and increased plasma water transudation should be responsible for the decrease in orthostatic tolerance established in subjects after bedrest. V.Z.

A72-45213 # Complex of measures preventing microbial contamination of spaceships and accumulation of microorganisms in them. V. I. Vashkov, N. V. Ramkova, E. N. Nikiforova, G. V. Shcheglova, and L. N. Rogatina. *International Astronautical Federation, International Astronautical Congress, 23rd, Vienna, Austria, Oct. 8-15, 1972, Paper. 6 p.*

The procedures by which the inhabited apartments of spaceships are made free from pathogenic and conditional pathogenic microflora, and with a sufficiently low general microflora level, are described. For preventing microflora accumulation in spacecraft during flight, apart from sanitary and hygienic measures, special methods were used, e.g., bacterial filters for air purification, wiping with disinfectants for reducing surface contamination, use of antimicrobial underclothes for limitation of microflora on the skin and underclothes, and preservation of human wastes to prevent microbial reproduction in them. F.R.L.

A72-45218 # Introduction to Vth International Space Rescue Symposium - Human stress tolerances in relation to time and intensity. P. A. Campbell (International Academy of Astronautics, Paris, France; Trinity University, San Antonio, Tex.). *International Astronautical Federation, International Astronautical Congress, 23rd, Vienna, Austria, Oct. 8-15, 1972, Paper. 16 p. 11 refs.*

The strengths and weaknesses of the human element in manned space missions are considered, along with the endurance limits of the human organism and the stresses of space flight. International manned space experience, space related deaths, and near accidents are summarized. Situations that might require rescue at various space mission stages are pointed out, and present narrowly limited rescue capabilities are shown to render safety dependent almost exclusively on space vehicle and equipment reliability. Discussed situations that may produce difficulties for man include cabin decompression, oxygen depletion (anoxia), radiation, gravitational forces, onboard illness or injury, dehydration, food deprivation, heat and cold. M.V.E.

A72-45231 Intracellular potassium in cells of the distal tubule. R. N. Khuri, S. K. Agulian, and A. Kalloghlian (Beirut, American University, Beirut, Lebanon). *Pflügers Archiv*, vol. 335, no. 4, 1972, p. 297-308. 16 refs.

Using a new double-barreled K(+) selective liquid ion-exchange microelectrode effective intracellular K(+) ion concentration and the peritubular PD were measured simultaneously in single cells of the distal tubule of the rat kidney. The transepithelial PD was measured in the same kidney. A mean K(+) ion concentration of 46.5 plus or minus 1.6 mM was obtained in the distal tubule cells of normal rats. The effective intracellular K(+) ion concentration increased significantly to 60.5 plus or minus 2.1 mM with chronic K(+) loading and to 51.5 plus or minus 0.9 mM with metabolic alkalosis, and decreased significantly to 36.5 plus or minus 2.6 mM with chronic K(+) depletion and to 38.7 plus or minus 1.4 mM with metabolic acidosis. The luminal membrane PD was depolarized in the kaliuretic states of K(+) loading and alkalosis and hyper-polarized in the kaliopenic states of K(+) depletion and acidosis. Thus the summation of the observed chemical and electrical driving forces between the

cellular and luminal compartments could quantitatively account for the passive entry of K(+) into the lumen of the distal tubule under the different metabolic states. (Author)

A72-45232 Temperature-sensitive neurons in the brain stem - Their responses to brain temperature at different ambient temperatures. R. F. Hellon (Medical Research Council, London, England). *Pflügers Archiv*, vol. 335, no. 4, 1972, p. 323-334. 29 refs.

A72-45243 # The problem of the short-term memory (Zum problem des Kurzzeitgedächtnisses). H. Hieden-Sommer (Wien, Universität, Vienna, Austria). *Zeitschrift für experimentelle und angewandte Psychologie*, vol. 19, 3rd Quarter, 1972, p. 400-430. 42 refs. In German.

The theories concerning the operation of the short-term and the long-term memories are examined, taking also into account experiments regarding the capacity of the human mind to retain information which had been briefly presented. Experiments were conducted to determine the performance of the short-term memory under conditions involving various parameter values regarding the time of presentation, the magnitude of the unit of the presented material, and the time interval between individual tests. The results obtained confirm that there is a reciprocal relation between the span of the immediate memory and the length of time during which information can be recalled. G.R.

A72-45244 # Learning and solving complex problems of reasoning - A test-theoretical investigation of the complexity of compound problems of predictive logic (Das Lernen und Lösen komplexer Denkaufgaben - Eine testtheoretische Untersuchung der Komplexität zusammengesetzter aussagenlogischer Aufgaben). H. Scheiblechner (Wien, Universität, Vienna, Austria). *Zeitschrift für experimentelle und angewandte Psychologie*, vol. 19, 3rd Quarter, 1972, p. 476-506. 12 refs. In German.

Requirements regarding a general psychological theory of reasoning are discussed together with a psychological model for the solution of problems of reasoning. Questions of the design of specific problems are considered along with algebraic logical formulas and the representation of compound problems by elementary logical operations. It is pointed out that compound reasoning processes and test effects are very interesting from the point of view of the formation of psychological theories. Problems of parameter estimation are discussed along with an exploratory study. It is found that human reasoning uses a smaller number of psychologically elementary operations than would be expected according to the number of set-theoretic elementary operations. G.R.

A72-45277 * Chemically regenerated foods. J. Shapira (NASA, Ames Research Center, Moffett Field, Calif.). *Environmental Biology and Medicine*, vol. 1, 1971, p. 243-251. 75 refs.

The raw materials for the synthesis of food for the crew of a spacecraft would be the major metabolic products carbon dioxide and water. Synthetic processes could develop carbohydrates, fats, or proteins. The one potential method of sugar synthesis which has received most attention makes use of the formose reaction. Various aspects of this method are discussed, giving attention also to the nutritional qualities of formose sugars. Questions regarding the utilization of glycerol, propylene glycol, and ethanol as dietary components are also examined. The possibility is considered to use the triglyceride triacetin as food. The use of free amino acids does not appear promising. Methods are described for the synthesis of formaldehyde from carbon dioxide and the synthesis of glycerol from formaldehyde. G.R.

A72-45279 * Natural aging and radiation-induced life shortening in *Drosophila melanogaster*. J. Miquel, K. G. Bensch, D. E. Philpott (NASA, Ames Research Center, Moffett Field; Stanford

University, Stanford, Calif.), and H. Atlan. *Mechanisms of Ageing and Development*, vol. 1, 1972, p. 71-97. 41 refs.

A72-45374 Human blood monocytes - Stimulators of granulocyte and mononuclear colony formation in vitro. P. A. Chervenick and A. F. LoBuglio (Ohio State University, Columbus, Ohio). *Science*, vol. 178, Oct. 13, 1972, p. 164-166. 25 refs. Research supported by the American Cancer Society, Health Research and Services; Grants No. PHS-AM-14352-03; No. NIH-1-R01-CA-13381-01.

A study is described which indicates that the blood monocyte is the cell responsible for colony-stimulating factor (CSF) production, and for the stimulation, in vitro, of granulocyte and mononuclear cell growth. Human blood kept from coagulating was separated into a number of leucocyte fractions. The ability of specific leukocyte fractions and conditioned medium prepared from these fractions to stimulate colony growth in vitro was tested in a soft gel system for cultivating mouse bone marrow. CSF was produced only by those fractions containing monocytes. Neutrophils not only failed to produce CSF, but were inhibitory to colony formation. F.R.L.

A72-45375 Water-soluble insulin receptors from human lymphocytes. J. R. Gavin, III, D. N. Buell, and J. Roth (U.S. Public Health Service, Bethesda, Md.). *Science*, vol. 178, Oct. 13, 1972, p. 168, 169. 14 refs.

Specific insulin receptors from human lymphocytes in culture have been prepared in aqueous solution without use of detergents or related compounds. Receptors prepared in this fashion exhibit characteristics identical to those reported in intact cells. (Author)

A72-45376 Acrylamide polymerization - New method for determining the oxygen content in blood. J. Folkman, H. Conn, and R. Harmel (Children's Hospital Medical Center; Harvard University, Boston, Mass.). *Science*, vol. 178, Oct. 13, 1972, p. 170-172. 5 refs. Research supported by the Zaffaroni Foundation.

A new principle for determining the oxygen content of 0.1-milliliter blood samples has been developed, based on measurement of the delay in gelation during copolymerization of acrylamide and bisacrylamide initiated by free radicals. The logarithm of this time interval is linearly proportional to the oxygen content of the blood sample over the range from 0 to 22 milliliters of oxygen per 100 milliliters of whole blood. Physiological variations of pH and pCO₂ do not affect the sensitivity of the assay. (Author)

A72-45377 Metacontrast and saccadic suppression. E. Matin, A. B. Clymer, and L. Matin (Columbia University, New York, N.Y.). *Science*, vol. 178, Oct. 13, 1972, p. 179-182. 23 refs. NSF Grant No. GB-5947; Grant No. NIH-RO1-EY-00375.

A vertical slit of light illuminated during horizontal saccadic eye movements appeared as a horizontally extended smear when stimulation was terminated before the saccade ended. However, on trials for which duration of illumination of the slit was extended into the period after the saccade, the smear appeared shorter and dimmer, and a clear image of the slit was seen. With further increases in duration, no smears were seen at the highest luminance of the slit employed, although smears were more than 2 log units above threshold when flashes were brief. This saccadic suppression is discussed in terms of metacontrast, with the accumulated luminance in the period after the saccade primarily responsible for masking the effects of the stimulation received during the movement of the eye. (Author)

A72-45508 # Ergatic control system synthesis (Sintez ergaticheskikh sistem upravleniia). V. V. Pavlov, A. N. Voronin, and A. M. Meleshev. *Kibernetika i Vychislitel'naia Tekhnika*, no. 13, 1972, p.

4-18. 5 refs. In Russian.

Discussion of a technique for synthesis of control systems containing a human operator as a component of their control circuit. A method is described for deriving the operational characteristics of such human operators. An iteration procedure is also given for the selection of a quality criterion for man-containing control circuits. A new version of estimation method is proposed for determining the weighted coefficients of the optimization potential of such control systems. V.Z.

A72-45509 # Problems of complex object modeling based on heuristic self-organization (Problemy modelirovaniia slozhnykh ob'ektov na osnove evristicheskoi samoorganizatsii). A. G. Ivakhnenko, V. D. Dimitrov, N. V. Gulian, and L. N. Ivakhnenko. *Kibernetika i Vychislitel'naia Tekhnika*, no. 13, 1972, p. 18-38. 21 refs. In Russian.

It is shown that the application of the concept of self-organization is necessary to develop a mathematical model of complex objects such as processes of thinking. Algorithms using this approach are developed for several types of human thinking by the argument group count method. The relation between the formal and creative components of human thinking is discussed. Other topics include the generation of heuristics, cybernetic models as devices reflecting ambient media, the construction of an automatic system according to an argument group count algorithm, and complex object models based on heuristic self-organization and mass selection. V.Z.

A72-45510 # Invariant transformation of the control laws in ergatic systems (Invariantnoe preobrazovanie zakonov upravleniia v ergaticheskikh sistemakh). V. V. Pavlov. *Kibernetika i Vychislitel'naia Tekhnika*, no. 13, 1972, p. 38-43. In Russian.

An invariant transform is derived for obtaining a sequence of control laws for ergatic systems. The transform is used to synthesize an ergatic control system which functions with a prescribed accuracy. This method is applicable to ergatic control systems including conventional control and stabilization systems, to holonomic control systems, to differential-game systems and to heuristic systems. V.Z.

A72-45514 # Mathematical description of a human operator in ergatic control systems (Matematicheskoe opisaniie cheloveka-operatora v ergaticheskikh sistemakh upravleniia). D. I. Paleichuk and V. S. Khominich. *Kibernetika i Vychislitel'naia Tekhnika*, no. 13, 1972, p. 60-64. 5 refs. In Russian.

Several types of mathematical models are described which are presently used in the analytical theory of ergatic control systems. It is demonstrated that the problem of optimal man-machine function distribution in automatic control systems cannot be solved by using conventional transfer functions. It is shown, rather, that other techniques must be used for synthesis of systems with optimal man-machine function distributions. These techniques involve the generalization of the working characteristics which relate the accuracy and time to failure of a human operator to the input signal operator and input signal functional transformation operator in a closed control system. V.Z.

A72-45515 # Algorithmic description of the generalized operational characteristic of a human operator (Algoritmiticheskoe opisaniie obobshchennoi rabochei kharakteristiki cheloveka-operatora). N. L. Gavrilova. *Kibernetika i Vychislitel'naia Tekhnika*, no. 13, 1972, p. 64-66. In Russian.

A72-45516 # Estimate of the operational efficiency of a human operator in the follow-up mode of a closed-loop control system (Otsenka effektivnosti raboty cheloveka-operatora v rezhime sledzheniia zamknutoi sistemy upravleniia). I. Iu. Tashmatov. *Kiber-*

netika i Vychislitel'naia Tekhnika, no. 13, 1972, p. 67-71. 6 refs. In Russian.

A72-45517 # Methodical aspects of studies of ergatic differential-game systems (Metodicheskie voprosy issledovaniia ergaticheskikh differentsial'no-igrovyykh sistem). V. L. Baranov. *Kibernetika i Vychislitel'naia Tekhnika*, no. 13, 1972, p. 71-77. 14 refs. In Russian.

Several problems of ergatic differential-game systems are formulated. Possible methods for solving these problems are discussed. The activity of a human operator in controlling dynamic plants in game situations is analyzed by a quantitative study of ergatic control systems. The succession of operations is determined for the solution of the problem of optimal man-machine control function distribution in ergatic automatic differential-game systems. V.Z.

A72-45520 # Man in a control circuit during an information game synthesis (Chelovek v konture upravleniia pri sinteze v informatsionnoi igre). N. L. Gavrilova. *Kibernetika i Vychislitel'naia Tekhnika*, no. 13, 1972, p. 90-92. In Russian.

Synthesis of automatic control for an information game is treated as a situation recognition process. The mathematical nature of this process is analyzed. An algorithm is derived for the realization of this process with the participation of a human operator. V.Z.

A72-45521 # Experimental determination of the distribution rule for the time of failure-free operator action in the tracking mode /with pursuit/ (Eksperimental'noe opredelenie zakona raspredeleniia vremeni bezotkaznoi raboty operatora v rezhime slezheniia /s presledovaniem/). I. Iu. Tashmatov. *Kibernetika i Vychislitel'naia Tekhnika* no. 13, 1972, p. 94-102. 7 refs. In Russian.

A72-45522 # Theoretical-experimental method for parametric synthesis of director-type control systems (Teoretiko-eksperimental'nyi metod parametricheskogo sinteza sistem direktornogo upravleniia). D. I. Paleichuk, V. S. Khorninich, and V. A. Shmat. *Kibernetika i Vychislitel'naia Tekhnika* no. 13, 1972, p. 12-107. 6 refs. In Russian.

A72-45523 # Investigation of an ergatic differential game (Issledovanie odnoi ergaticheskoi differentsial'noi igry). V. L. Baranov. *Kibernetika i Vychislitel'naia Tekhnika*, no. 13, 1972, p. 107-115. 6 refs. In Russian.

Analytical methods developed by the author for ergatic differential-game systems are applied to a study of a specific situation in the interception avoidance game on a plane. Variations in the probability of avoidance are determined in relation to the parameters of the differential avoidance game. Decision making by a human operator in an avoidance game against a pursuer who uses randomly selected aiming techniques is analyzed. The capabilities of a human operator to solve avoidance game problems are assessed. V.Z.

A72-45651 * In vivo hemolysis due to hyperoxia - Role of H₂O₂ accumulation. W. P. Johnson, D. Jefferson, and C. E. Mengel (Missouri, University, Columbia, Mo.). *Aerospace Medicine*, vol. 43, Sept. 1972, p. 943-945. 11 refs. Grant No. NIH-CA-11447; Contracts No. NAS9-9209; No. NAS9-9417; No. N00014-67-A-0003.

A72-45652 Interactions between gas bubbles and components of the blood - Implications in decompression sickness. R. B. Philp, M. J. Inwood, and B. A. Warren (Western Ontario, University,

London, Ontario, Canada). *Aerospace Medicine*, vol. 43, Sept. 1972, p. 946-953. 38 refs. Research supported by the Defence Research Board and Medical Research Council of Canada.

A72-45653 Relationship of sodium deprivation to +Gz acceleration tolerance. S. J. Shubrooks, Jr. (USAF, School of Aerospace Medicine, Brooks AFB, Tex.). *Aerospace Medicine*, vol. 43, Sept. 1972, p. 954-956. 7 refs.

Study of +Gz acceleration tolerance for 16 normal volunteer subjects both during a normal uncontrolled diet and during a period of negative sodium and water balance produced by dietary restriction. Four subjects were studied on each of four different levels of sodium intake - 10, 50, 100 and 150 mEq sodium/24 hr.; water intake was limited to 2000 cc/24 hr for all. With the dietary restriction changes in plasma volume ranged from undetectable to a 23% reduction, and +Gz tolerance decreased for all subjects (P less than 0.001). Decreases during rapid onset (1 G/sec.) runs ranged from 0.2 to 0.7 G and during gradual onset (1 G/15 sec.) runs from 0.2 to 1.35 G. The effect on +Gz tolerance of these relatively small negative salt and water balances is particularly significant in view of the much greater deficits experienced by flying personnel in tropical environments. (Author)

A72-45654 Relation between a pilot's sensory perception of linear accelerations and the aircraft motion. B. Caiger (National Aeronautical Establishment, Ottawa, Canada). *Aerospace Medicine*, vol. 43, Sept. 1972, p. 957, 958.

A72-45655 California psychological inventory as a predictor of success in the Naval flight program. S. F. Bucky and S. L. Ridley (U.S. Naval Aerospace Medical Center, Aerospace Medical Institute, Pensacola, Fla.). *Aerospace Medicine*, vol. 43, Sept. 1972, p. 971-973. 8 refs.

A72-45656 Unconjugated urinary corticosterone excretion in laboratory rats exposed to high pressure helium-oxygen environments. R. A. Bitter and T. W. Nielsen (North Dakota, University, Grand Forks, N. Dak.). *Aerospace Medicine*, vol. 43, Sept. 1972, p. 984-988. 20 refs. Contract No. N00014-68-A-0499. NR Project 101-573.

A72-45657 Analysis of pilot assessment of workload. W. J. Krzanowski and A. N. Nicholson (RAF, Institute of Aviation Medicine, Farnborough, Hants., England). *Aerospace Medicine*, vol. 43, Sept. 1972, p. 993-997.

About 200 letdowns within a 4-yr period have been studied, and an attempt is made to determine the technique used by the pilot in evaluating overall workload from the various factors of the letdown, and to assess the consistency of his technique. The individual factors considered are (1) aircraft with reference to technical serviceability, efficiency of the crew, and problems associated with passengers, (2) the availability of navigational aids, (3) meteorological conditions, (4) the physical features of the airport, and (5) the efficiency of the control procedures. The study suggests that assessments of workload by aircrew under difficult circumstances should be based on individual factors of workload rather than overall impressions of total difficulty, and that predicted workload using a suitable model based on the individual factors of workload may prove valuable for letdowns of limited difficulty. F.R.L.

A72-45658 Response to daily lower body negative pressure /LBNP/ exposure /-70mm Hg/, with emphasis on plasma renin activity, sodium and potassium excretion. D. R. Stoop and J. P. Hoche (U.S. Navy, Naval Aerospace Medical Research Laboratory, Pensacola, Fla.). *Aerospace Medicine*, vol. 43, Sept. 1972, p. 1002-1004. 13 refs.

A72-45659 * Influence of vision on susceptibility to acute motion sickness studied under quantifiable stimulus-response conditions. W. J. Oosterveld (Amsterdam, Universiteit, Amsterdam, Netherlands), A. Graybiel (U.S. Navy, Naval Aerospace Medical Research Laboratory, Pensacola, Fla.), and D. B. Cramer (Northwestern University, Evanston, Ill.). *Aerospace Medicine*, vol. 43, Sept. 1972, p. 1005-1007. 6 refs. NASA-supported research. NASA Order W-13433.

A72-45660 Physiologic responses to short duration Gz. G. H. Kydd (U.S. Naval Material Command, Naval Air Development Center, Warminster, Pa.). *Aerospace Medicine*, vol. 43, Sept. 1972, p. 1014-1019. 15 refs.

Subjects have been subjected to Gz (positive) haversine accelerations of short duration and high magnitude on the centrifuge, and their responses to peripheral lights have been recorded. Whereas most subjects lost the peripheral lights during the 6-sec haversine, only one did so during the 4-sec run. Since the acceleration is maximum at 1/2 tau for the haversine, this means that a rise time of 6 Gz in 3 sec caused peripheral light loss whereas 10 Gz in 2 sec did not. The data thus indicate that the time for no response to a rapidly rising acceleration is greater than 2 sec (no response to a 4-sec haversine) and less than 3 sec (peripheral light loss to a 6-sec haversine). The characteristics of the haversine in evaluating centrifuge response are discussed. (Author)

A72-45661 Hazard rate of symptomatic recurrence in Hodgkins disease. F. G. Conrad, M. F. Allen, H. R. Bales, Jr., and R. G. Rossing (USAF, School of Aerospace Medicine, Brooks AFB, Tex.). *Aerospace Medicine*, vol. 43, Sept. 1972, p. 1020-1023. 9 refs.

A problem of major concern to flight surgeons is when to return rated personnel to flying duties following the occurrence of a malignant disorder. It is now possible to analyze total Air Force experience concerning cancer treatment and survival. Raw survival data can be extrapolated by the life table method, and two functions which describe different aspects of survival can be computed. One of these, the 'hazard function,' provides information on the likelihood of developing recurrent disease almost immediately for all patients who have survived to the beginning of any given time period. This allows accurate predictions as to the percentage of those patients who, having survived for a certain period of time following definitive surgery, will fail during the immediately succeeding time. An acceptable risk can then be determined, and, by using a plotted curve, it is possible to determine at which point in time following initial treatment a given group of patients will fall below a certain chance of developing an immediate recurrence. This is a most powerful statistical concept and for the first time allows the flight surgeon to state in terms of P values the percentage of expected recurrence at any point in time in order to come to a relatively definitive decision, regarding return to flying status. (Author)

A72-45662 Intoxicating liquor and the general aviation pilot in 1971. L. C. Ryan and S. R. Mohler (FAA, Office of Aviation Medicine, Washington, D.C.). (*Aerospace Medical Association, Annual Scientific Meeting, 43rd, Bal Harbour, Fla., May 8-11, 1972.*) *Aerospace Medicine*, vol. 43, Sept. 1972, p. 1024-1026. 10 refs.

Alcoholic beverages continue to be associated with general aviation accidents. In 1963 43% of the fatal aircraft accidents involved alcohol. However, since 1963 the percentage of alcohol involvement has decreased from 43 to 20% in 1968. Since 1968, the percentage of alcohol involvement has remained fairly stable at about 20%. In 1971 the eight-hour 'bottle-to-throttle' abstinence rule was in effect. From an analysis of the fatal accident data it appears that the new rule had a beneficial effect. One of the remaining problems appears to be the heavily drinking, chronic alcoholic. (Author)

A72-45663 # Keratoconus in USAF flying personnel. W. E. Barry and T. J. Tredici (USAF, School of Aerospace Medicine, Brooks AFB, Tex.). *Aerospace Medicine*, vol. 43, Sept. 1972, p. 1027-1030. 15 refs.

Despite the rigid screening of all categories of rated personnel for the ability to meet stringent visual standards, cases of keratoconus continue to occur in the USAF flying population. Some recent experience with this disease entity is reviewed. Aspects of incidence, early diagnosis, serial progression and treatment are discussed. Two cases of keratoconus which developed after four years of corneal contact lens wear are presented; and the increasing problem of intentional corneal molding (orthokeratology) is reviewed. (Author)

A72-45664 Aeromedical considerations in the management of paranasal sinus barotrauma. J. P. Smith and D. E. Furry (U.S. Naval Aerospace Medical Center, Aerospace Medical Institute, Pensacola, Fla.). *Aerospace Medicine*, vol. 43, Sept. 1972, p. 1031-1033. 10 refs.

In a retrospective study of the occurrence of sinus barotrauma in personnel undergoing training in altitude chambers over a 10-year period, the overall incidence rate was found to be 1.16%. Of these, 1.21% occurred at simulated altitudes of 30,000 ft and 1.14% at 43,000 ft. Clinical findings on 29 persons found to suffer sinus barotrauma during a recent six-month study at the Naval Aerospace Medical Institute are presented. Radiological studies on 18 of the 29 showed significant pathological changes. Symptoms of frontal sinusitis were seen in 25 and of maxillary sinusitis in four. Radiographic evaluation facilitates the diagnosis, and the use of hypobaric test procedures is of value in determining the time-course for restoration to full flight status in patients with paranasal sinus pathology. (Author)

A72-45689 Longevity and cardiovascular mortality among former college athletes. A. P. Polednak (Waterloo, University, Waterloo, Ontario, Canada). *Circulation*, vol. 46, Oct. 1972, p. 649-654. 20 refs.

Among 681 former Harvard College athletes (lettermen), longevity and cardiovascular mortality differed not by type of sport but by extent of participation. Relative to one-letter and two-letter athletes, men with three or more letters died slightly earlier from natural causes, and significantly more often and slightly earlier from cardiovascular diseases and (specifically) coronary heart disease. The three-or-more-letter athletes differed in physique, being significantly more mesomorphic (muscular, bony) than the other two groups. Further analysis suggested that physique did not account for these differences; other possible explanations were discussed. (Author)

A72-45690 P-V intervals in left bundle-branch block: Clinical and electrocardiographic correlations. K. M. Rosen, A. Ehsani, and S. H. Rahimtoola (Cook County Hospital, Illinois, University, Chicago, Ill.). *Circulation*, vol. 46, Oct. 1972, p. 717-723. 19 refs. Grant No. NIH-71-2478.

A72-45691 Clinical and anatomic implications of intra-ventricular conduction blocks in acute myocardial infarction. M. Scheinman (San Francisco General Hospital, San Francisco, Calif.) and E. Benenman (California, University, San Francisco, Calif.). *Circulation*, vol. 46, Oct. 1972, p. 753-760. 22 refs.

STAR ENTRIES

N72-32080* National Aeronautics and Space Administration, Washington, D.C.

AEROSPACE MEDICINE AND BIOLOGY: A CONTINUING BIBLIOGRAPHY WITH INDEXES, SUPPLEMENT 104, JULY 1972

Jul. 1972 134 p refs
(NASA-SP-7011(104)) Avail: NTIS HC \$3.00 CSCL 06E

This special bibliography lists 409 reports, articles, and other documents introduced into the NASA scientific and technical information system in June 1972. Author

N72-32081* California Univ., San Diego. Dept. of Neurosciences.

ELECTROPHYSIOLOGICAL STUDIES OF THE NERVOUS SYSTEM Final Report, Jan. 1970 - May 1972

Robert Galambos 21 Jul. 1972 10 p refs
(Grant NGR-05-009-083)

(NASA-CR-128249) Avail: NTIS HC \$3.00 CSCL 06P

The electrophysiology of the nervous system is studied using cats and human subjects. Data cover effects of chloralose on evoked potential, the evoked resistance shift that accompanies evoked potentials, and the relationship of eye movements to potentials aroused by visual stimulation. Author

N72-32082* Maryland Univ., College Park. Dept. of Botany.
A STUDY OF PHYCOPHYSIOLOGY IN CONTROLLED ENVIRONMENTS

Robert W. Krauss 15 Jun. 1971 67 p refs
(Grant NGR-21-002-003)

(NASA-CR-128296; SASR-22; TR-1022) Avail: NTIS HC \$5.50 CSCL 06P

The primary objective of this research is to obtain fundamental data concerning the growth and metabolism of the unicellular green algae. These organisms are most likely to provide biological oxygen and a food source for space crews. Biochemical conversions, chemical composition, and cell growth and division are discussed. *Chlorella sorokiniana* is emphasized. J.A.M.

N72-32083* Colorado State Univ., Fort Collins.

RARE-GAS EFFECTS ON METABOLISM AND INERT GAS NARCOSIS Semiannual Status Report

30 Apr. 1972 83 p refs

(Grant NGR-06-002-075)
(NASA-CR-128213) Avail: NTIS HC \$6.25 CSCL 06P

The detailed examination is reported of the theory that narcosis results from expansion of the cell membrane under high partial pressures. The research is partially based on the hypothesis that, like oxygen toxicity, the mechanism of metabolic effects of rare gases may be similar at both low and high pressures and are simply more observable at high pressures. Using adult female goats, the parameters measured include oxygen consumption, CO₂ production, respiration rate, heart rate, rectal and skin temperatures and the analysis of electroencephalograms and evoked response. Additionally, the specific activity is measured

of plasma glucose subsequent to injection of glucose-UL-C-14, intravenous infusion, specific activity of expired CO₂, unesterified fatty acid levels and whole blood lactate-to-pyruvate ratios. Also studied were the effects of acetylsalicylic acid, vitamin E and cationic detergents (which alleviate narcosis) upon metabolic changes induced by high pressure narcosis. Author

N72-32084* Joint Publications Research Service, Arlington, Va.
SPATIAL ORIENTATION OF BATS UNDER THE INFLUENCE OF INCREASED GRAVITY

E. Sh. Ayrapetyants, V. N. Zvorykin, and B. M. Savin 23 May 1972 6 p refs Transl. into ENGLISH from Dokl. Akad. Nauk SSSR (Moscow), no. 3, 1972 p 723-725
(JPRS-56073) Avail: NTIS HC \$3.00

An examination of bat orientation in space by echolocation is presented. Data cover spatial analysis in echolocating animals after sharp functional changes in their acceleration system resulting from exposure to increased gravity. The study shows that severe functional changes in the acceleration system lead to impairment of the mechanism of echolocation, suggesting that there are definite functional interrelations between these systems which apparently play a major role in spatial analysis. Author

N72-32085* Translation Consultants, Ltd., Arlington, Va.
PHYSIOLOGICAL CHANGES DURING PROLONGED BED REST

K. Rodahl, N. C. Birkhead, J. J. Blizzard, B. Issekutz, Jr., and E. D. R. Pruett Washington NASA Aug. 1972 8 p refs Transl. into ENGLISH from Nord. Med. (Stockholm), v. 75, no. 7; Feb. 1966 p 182-186
(Contract NASw-2038)

(NASA-TT-F-14342) Avail: NTIS HC \$3.00 CSCL 06P

Effects of prolonged bed rest on physical work capacity, tilt-table tolerance, and urinary calcium excretion were studied. It was concluded that reduced physical work capacity is caused by the inactivity associated with prolonged bed rest; impaired tilt-table tolerance is due to the absence of the necessary cardiodynamic stress required for the maintenance of the cardiovascular regulatory mechanism, and increased urinary calcium excretion is due to the absence of the normal longitudinal pressure in the long bones. Author

N72-32086* Scientific Translation Service, Santa Barbara, Calif.

PROBLEMS OF HEAT STERILIZATION DYNAMICS

S. Komemushi Washington NASA Aug. 1972 30 p refs Transl. into ENGLISH from Hakko Kogaku Zasshi (Osaka), v. 49, no. 8, Aug. 1971 p 706-715
(Contract NASw-2035)

(NASA-TT-F-14543) Avail: NTIS HC \$3.50 CSCL 06M

Death behavior of microorganisms during heat sterilization is studied in connection with conformity or nonconformity to the logarithmic death law. Various interpretations of the dynamics of the logarithmic death law are cited from the literature, and possible explanations for nonlogarithmic death curves are advanced. The role of thermal activation phenomena in heat sterilization is discussed. Author

N72-32087* Scientific Translation Service, Santa Barbara, Calif.

THE TERMINAL DECONTAMINATION OF ROOMS. EVALUATION OF EFFICACY CHECK

G. Reybrouck and H. VandeVoorde Washington NASA Aug. 1972 20 p refs Transl. into ENGLISH from Prod. Pharm. (Paris), v. 27, 1972 p 199-206
(Contract NASw-2035)

(NASA-TT-F-14544) Avail: NTIS HC \$3.00 CSCL 06M

The various methods successively applied to check the efficacy of the terminal decontamination of rooms by means of

gaseous formaldehyde are described. All the contaminated carriers were exposed to the action of the formaldehyde vapor in the test room. Although a high level of formaldehyde in the air was measured, not all the carriers inoculated by a high inoculum of bacteria were sterilized. The causes of the failure are discussed, and recommendations for further investigations are formulated. Author

N72-32088*# Techtran Corp., Glen Burnie, Md.
PROLONGED ACTION OF MEDIUM INTENSITY NOISE ON THE FUNCTIONAL CONDITION OF AN ORGANISM
 O. P. Kozerenko, E. I. Matsnev, V. I. Myasnikov, and I. Ya. Yakovleva Washington NASA Sep. 1972 18 p refs Transl. into ENGLISH from Izv. Akad. Nauk SSSR, Ser. Biol. (Moscow), no. 4, Jul.-Aug. 1967 p 527-535
 (Contract NASw-2037)

(NASA-TT-F-14567) Avail: NTIS HC \$3.00 CSCL 06S
 Experiments involving exposure to a wideband sonic background were conducted in an isolation chamber. Reactions to this exposure included fatigue, physical illness, irritability and cases of increased work ability. Author

N72-32089*# National Aeronautics and Space Administration, Washington, D.C.
QUESTION OF THE DAILY PERIODICAL HEARING IN A PERIOD IN CONDITIONS OF EXPOSURE TO PROLONGED NOISE

Yu. V. Krylov Sep. 1972 5 p refs Transl. into ENGLISH from the publ. "Aviakosmicheskaya Meditsina" Moscow, 1967 p 170-173
 (NASA-TT-F-14568) Avail: NTIS HC \$3.00 CSCL 06S

A description is given of experiments which reflect deviations in the hearability threshold of ± 4 to 5 db in the absence of noise and up to ± 17 db with various forms of noise. Author

N72-32090*# Translation Consultants, Ltd., Arlington, Va.
THE QUESTION OF THE EFFECT OF CUMULATIVE VERTICAL VIBRATION AND NOISE ON A SERIES OF PROTEIN, FAT, AND CARBOHYDRATE METABOLISM INDICES FOR WARM-BLOODED ANIMALS

G. I. Bondarev, Ye. N. Aronova, D. A. Mikelson, and L. Ya. Skuratova Washington NASA Sep. 1972 5 p Transl. into ENGLISH from Gigena Truda i Prof. Zabolevaniya (Moscow), no. 10 Oct. 1968 p 58-59
 (Contract NASw-2038)

(NASA-TT-F-14569) Avail: NTIS HC \$3.00 CSCL 06C
 The results of an investigation of the effect of vibration and noise, resembling that found aboard ships, on protein, fat, and carbohydrate metabolism indices in animals are discussed. Author

N72-32091*# Translation Consultants, Ltd., Arlington, Va.
INVESTIGATION OF THE INTERRELATIONSHIP BETWEEN THE BRAIN'S BIOELECTRIC AND ITS OXYGEN DEMAND UNDER VIBRATION EFFECTS

L. D. Lukyanova and Ye. P. Kazanskaya Washington NASA Sep. 1972 12 p refs Transl. into ENGLISH from Fiziologicheskii Zh. (USSR), v. 53, no. 5, May 1967 p 563-570
 (Contract NASw-2038)

(NASA-TT-F-14570) Avail: NTIS HC \$3.00 CSCL 06P
 The correlation between changes in bioelectric activity in superior portions of the cerebrum and their oxidizing metabolisms is analyzed. Author

N72-32092# Royal Aircraft Establishment, Farnborough (England).
CHANGES IN THE PULSE FREQUENCY RHYTHM IN

RELATION TO THE WORKLOAD

W. Laurig and U. Philipp Aug. 1972 19 p refs Transl. into ENGLISH from Arbeitsmed., Sozialmed., Arbeitshygiene (Leipzig), v. 5, 1970 p 184-188
 (RAE-Lib-Trans-1586) Avail: NTIS HC \$3.00

Starting with a phenomenological description of the heart rate rhythm, an arrhythmia condition was derived theoretically. Experimental results from physical and mental work gave values for the average behavior of the arrhythmia quotient in relation to the intensity of the work of a large collection of male subjects. A regression calculation over the individual results of all the experiments shows a reduction in the arrhythmia quotient with the workload. A control theory description is used for the behavior of the arrhythmia on rest. The significance of heart rate measurements in medical practice was discussed. Author

N72-32093# Royal Aircraft Establishment, Farnborough (England).

CIRCADIAN VARIATIONS IN CHOICE REACTION TIME

Ernst Poeppel and Juergen C. Aschoff Aug. 1972 19 p refs Transl. into ENGLISH from Z. Exp. Angew. Psychol. (W. Germany), v. 17, no. 4, 1970 p 537-552
 (RAE-Lib-Trans-1668; BR-31284) Avail: NTIS HC \$3.00

Four different experiments were performed to test how daily variations of reaction time to optical and acoustic stimuli are influenced if the natural rhythm of sleep and waking is disturbed. The amplitude of circadian variations is greatest if subjects are allowed to sleep during the experimental night and woken for experimental runs. Staying awake at night causes a decrease in the circadian amplitude. The motivation of the subjects and the repetition of experimental runs are important factors which have to be controlled in studies on circadian variations of psychological functions. Author

N72-32094*# Scientific Translation Service, Santa Barbara, Calif.

VIBRATION AS A FACTOR IN INCREASING THE EFFECT OF NOISE

P. S. Kublanova Washington NASA Sep. 1972 7 p Transl. into ENGLISH from Vopr. Kliniki Prof. Zabolevaniy (Moscow), 1969 p 73-77
 (Contract NASw-2035)

(NASA-TT-F-14542) Avail: NTIS HC \$3.00 CSCL 20A
 Osseous conductivity was studied in workers employed under conditions of noise and vibration. It is concluded that hearing should be checked at least once every six months after employment under such conditions. Author

N72-32095*# Scientific Translation Service, Santa Barbara, Calif.

PHARMACOLOGICAL AND PHYSIOLOGICAL STUDIES ON THE PERSPIRATION CENTERS

Bunichi Hasama Washington NASA Sep. 1972 21 p refs Transl. into ENGLISH from Arch. Exp. Pathol. Pharmacol. (Berlin), v. 153, 1930 p 291-308
 (Contract NASw-2035)

(NASA-TT-F-14545) Avail: NTIS HC \$3.25 CSCL 06P
 Potassium, barium and sodium ions have a temperature-increasing and diaphoretic effect of sympathetic nature on the heat and perspiration center, while magnesium and calcium ions inhibit both centers. The area of the heat and perspiration centers behaves antagonistically to potassium and calcium ions, like the peripheral organs. Magnesium and calcium ions are not antagonistic, but synergistic in their effect on these centers. In central sympathetic excitation, calcium in the centers may be exchanged for potassium ions in the blood, with the reverse action in central sympathetic relaxation. Author

N72-32096*# Scientific Translation Service, Santa Barbara, Calif.

REGULATORY MECHANISMS FOR FATTY ACID BIOSYNTHESIS

S. Numa, Takashi Hashimoto, and Shigetada Nakanishi
Washington NASA Sep. 1972 21 p refs Transl. into
ENGLISH from Seikagaku (Tokyo), v. 44, no. 4, 25 Apr. 1972
p 137-145

(Contract NASw-2035)

(NASA-TT-F-14549) Avail: NTIS HC \$3.25 CSCL 06P

Recent findings are reported concerning the regulatory mechanisms for the quantity and activity of acetyl-CoA carboxylase, which plays the role of the key enzyme in the regulation of fatty acid biosynthesis. When the speed of fatty acid synthesis must be changed immediately, the regulatory mechanism of changing the enzyme quantity will not be quick enough, and it is assumed that regulation is performed by varying the enzyme activity. In long-term regulation of fatty acid synthesis, however, it is assumed that the regulatory mechanism of changing the enzyme quantity also plays a role. Author

N72-32097*# Scientific Translation Service, Santa Barbara, Calif.

TOWARD KNOWLEDGE OF THE EFFECT OF MAGNESIUM ON THE BODY TEMPERATURE

Julius Schuetz Washington NASA Sep. 1972 7 p refs Transl. into ENGLISH from Arch. Exp. Pathol. Pharmacol. (Berlin), v. 79, 1916 p 285-290

(Contract NASw-2035)

(NASA-TT-F-14550) Avail: NTIS HC \$3.00 CSCL 06P

The narcotizing action of magnesium on the heat center predominates over the stimulating effect of tetrahydronaphthalene. Author

N72-32098*# Techtran Corp., Glen Burnie, Md.

EFFECT OF CAFFEINE ON ATHLETIC PERFORMANCE

H. Herxheimer Washington NASA Sep. 1972 8 p refs Transl. into ENGLISH from Muench. Med. Wochschr. (Munich), v. 69, 1922 p 1339-1340

(Contract NASw-2037)

(NASA-TT-F-14561) Avail: NTIS HC \$3.00 CSCL 06P

Caffeine administered orally (0.25 g) had no conclusively positive or negative effect on athletic performance (100-yard dash). Author

N72-32099*# Techtran Corp., Glen Burnie, Md.

COMPENSATION OF ALCOHOL EFFECTS BY CAFFEINE AND PERVITIN IN A PSYCHOMOTOR PERFORMANCE

J. Rutenfranz and G. Jansen. Washington NASA Sep. 1972 28 p refs Transl. into ENGLISH from Int. Z. Angew. Physiol. Einschl. Arbeitphysiol. (Berlin) v. 18, 1959 p 62-81

(Contract NASw-2037)

(NASA-TT-F-14564) Avail: NTIS HC \$3.50 CSCL 06P

Performance on the Graf driving machine was used to evaluate the sobering effect of caffeine and pervitin on subjects who had drunk alcohol. Nine mg pervitin per kg of body weight improved psychomotor performance after drinking 1 gram of alcohol/kg of body weight, while 0.2 g caffeine/kg body weight had no such effect. Other disturbed functions remained unaffected by pervitin, however. Author

N72-32100*# Scientific Translation Service, Santa Barbara, Calif.

HUMAN ENDURANCE OF IMPACT ANGULAR ACCELERATIONS

V. M. Tardov Washington NASA Sep. 1972 6 p Transl. into ENGLISH from Aviats. Kosmich. Med. (Moscow), v. 2, 1969 p 244-248 Presented at 30 All-Union Conf. on Aviation and Space Med., Kaluga, 10-13 Jun. 1969

(Contract NASw-2035)

(NASA-TT-F-14565) Avail: NTIS HC \$3.00 CSCL 06P

Human resistance to impact angular accelerations under

emergency conditions and the basic rules governing the human response to this type of action are studied. Author

N72-32101*# Scientific Translation Service, Santa Barbara, Calif.

A STUDY ON THE COMPRESSION STRENGTH OF HUMAN VERTEBRAE

S. A. Gozulov, V. A. Korzhen'yants, V. G. Skrupnik, and Yu. N. Sushkov Washington NASA Sep. 1972 11 p refs Transl. into ENGLISH from Arkh. Anat., Gistol. i Embriol. (Moscow), v. 51, no. 9, 1966 p 13-18

(Contract NASw-2035)

(NASA-TT-F-14566) Avail: NTIS HC \$3.00 CSCL 06P

The strength of the vertebrae in the age group from 19 to 40 years underwent changes under the rate of loading 10 mm/min, on the average from 400 kg in the cervical region to 1300 kg in the lumbar one. In case of axial loading the sublimbic zone proved to be the weakest part of the vertebra. Deformation of the vertebral bodies by 6 to 10% did not affect elastic properties of the osseous tissue and was not accompanied by macroscopic changes in the structure. Injurious processes develop in a definite sequence, in accordance with magnitude of the applied force and deformation. The strength of the intervertebral discs slightly exceeds that of the vertebrae. The lumbar intervertebral discs showed the greatest power of endurance, while the cervical ones were the weakest. Mechanical characteristics of the vertebrae and of the intervertebral discs vary considerably attaining from 20 to 50% of the mean arithmetical values. Author

N72-32102*# Scientific Translation Service, Santa Barbara, Calif.

HUMAN ENDURANCE OF BRIEF (IMPACT) OVERLOADS (THE PROBLEM OF SELECTING A MECHANICAL MODEL)

G. I. Severin, A. S. Povitskiy, and B. A. Rabinovich Washington NASA Sep. 1972 5 p Transl. into ENGLISH from Aviats. Kosmich. Med. (Moscow), v. 2, 1969 p 202-205

(Contract NASw-2035)

(NASA-TT-F-14571) Avail: NTIS HC \$3.00 CSCL 06S

Human endurance of impact overloads was investigated. It was assumed that the endurance limit is determined by mechanical stresses in the human body. Author

N72-32103*# Techtran Corp., Glen Burnie, Md.

INTRAPERITONEAL ADMINISTRATION OF A PHYSIOLOGICAL SOLUTION AS A SUPPLEMENTARY METHOD FOR HYDRATION OF AN ORGANISM

I. V. Anpilov Washington NASA Sep. 1972 5 p refs Transl. into ENGLISH from Klinich. Med. (Moscow), v. 6, no. 20, 1966 p 142-143

(Contract NASw-2037)

(NASA-TT-F-14574) Avail: NTIS HC \$3.00 CSCL 06E

Administration of 2.5 to 3.5 liters of physiological solution into the peritoneal cavity for 40 to 50 minutes was found to be beneficial in correcting excessive water loss in man. Author

N72-32104*# Techtran Corp., Glen Burnie, Md.

ULTRASTRUCTURAL LOCALIZATION OF THE ALKALINE PHOSPHATASE ACTIVITY IN THE INTERRENAL CELLS OF THE TAILED AMPHIBIAN TRITURUS CRISTATUS

J. P. Berchtold and J. S. Hugon Washington NASA Sep. 1972 12 p Transl. into ENGLISH from Histochemie (Berlin), v. 26, 1971 p 258-265

(Contract NASw-2037)

(NASA-TT-F-14577) Avail: NTIS HC \$3.00 CSCL 06C

The alkaline phosphatase activity of interrenal (adrenocortical) cells of the tailed amphibian Triturus cristatus is almost exclusively located in the cytoplasmic membranes. This activity is variable from cell to cell, sometimes even missing. All the microvilli of

the cellular surface, as well as the pinocytotic vesicles, show alkaline phosphatase activity. The product of the enzymatic reaction is also associated with several short tubules located in the vicinity of the cytoplasmic membrane; these tubules have probably a pinocytotic signification. The product of the enzymatic reaction can also be observed at the periphery of the multivesicular bodies; the origin of alkaline phosphatase activity in these structures is discussed. The other cytoplasmic organelles do not show any activity. The enzymatic reaction, on the other hand, does not take place in cells which have been incubated in a medium without substrate, or preincubated in a solution containing L-cysteine. Author

N72-32105*# Techtran Corp., Glen Burnie, Md.
THE ACTIVITY OF COLLAGENASES AND THE COLLAGEN CONTENT OF THE SKIN DURING CARCINOGENESIS
 R. Rohrbach, C. Thomas, R. Ruempler, and M. Lau Washington NASA Sep. 1972 12 p refs Transl. into ENGLISH from Verhandl. Deut. Ges. Pathol. (Stuttgart), v. 54, 1970 p 442-450 (Contract NASw-2037)
 (NASA-TT-F-14579) Avail: NTIS HC \$3.00 CSCL 06P

During carcinogenesis in the skin of hairless mice the activity of specific collagenases was investigated with the assistance of a synthetic substrate of polypeptides. In carcinogen-treated skin, a remarkable amount of enzyme activity (up to 300% in comparison with the untreated skin), was found. A higher activity was seen in the dermis than in the epidermal layer. In papillomas the enzyme activity was still greater. Highest values were measured from marginal regions of fully developed carcinomas. The total collagen content of the skin was significantly reduced. Higher activity of collagenases has therefore to be considered to lower the total collagen content. Author

N72-32106*# Translation Consultants, Ltd., Arlington, Va.
STUDY OF THE RESISTANCE TO INFECTION OF PREGNANT WOMEN BY THE LYMPHOBLASTIC TRANSFORMATION TEST
 P. Morin, D. Alcala, and J. Choukroun Washington NASA Oct. 1972 6 p refs Transl. into ENGLISH from Gynecol. Obstet. (France), v. 70, no. 1, 1971 p 55-58
 (Contract NASw-2038)
 (NASA-TT-F-14591) Avail: NTIS HC \$3.00 CSCL 06P

Resistance to infection of pregnant women was studied by the lymphoblastic transformation test. The response to PHA is shown to decrease during pregnancy, indicating a relative immunity tolerance during gestation. Author

N72-32107# Joint Publications Research Service, Arlington, Va.
BIOMEDICAL PROBLEMS OF SPACE FLIGHT
 Yu. G. Grigoryev, ed., I. M. Khazen, ed., F. P. Kosmolinskiy, ed., V. D. Yablochkin, ed., R. A. Belitskaya, ed., Ye. P. Yevsyukov, ed., and A. I. Ushanov, ed. 28 Oct. 1970 336 p refs Transl. into ENGLISH of "Materialy 3 Nauchnoy Konferentsii Molodykh Spetsialistov" Moscow, USSR Health Min. Inst. of Biomed. Probl., 1969 Conf. held in 1969
 (JPRS-51660) Avail: NTIS HC \$19.00

Articles on the biomedical problems of space flight are presented. The articles are concerned with the following subjects: (1) biology and microbiology, (2) central nervous system and endocrinal system, (3) cardiovascular system and hematology, (4) physiology of analyzers, (5) metabolism, respiration, and dietary physiology, (6) biochemistry, space pharmacology, and pharmacy, (7) work psychology, hygiene, and toxicology, and (8) radiobiology. Author

N72-32108# Royal Aircraft Establishment, Farnborough (England).
OXYGEN DIFFUSION IN THE BRAIN. PART 2: OXYGEN DIFFUSION WITH O₂ DEFICIENCY

K. Diemer Jul. 1972 17 p refs Transl. into ENGLISH from Pfluegers Arch. (Berlin), v. 285, 1965 p 109-118
 (RAE-Lib-Trans-1661) Avail: NTIS HC \$3.00

On the basis of certain assumptions and calculations, the following points arise: Under normal conditions, the brain works with an excess of oxygen, with an oxygen pressure reserve of about 9 mmHg. Within this region, the reduction of arterial or venous pO₂ leads only to a displacement of the isobars in the tissue. As the result of shifting and regrouping of the areas of tissue supplied by individual capillaries, arising solely from changed conditions of oxygen pressure, slight variations in the pO₂ are completely absorbed in the blood. In this way, the tissue pO₂ is always maintained at the highest possible level; under normal conditions, the lowest pO₂ in the tissue can be as high as the venous pO₂, so achieving the maximum value possible. There are basic differences between the effects of arterial and venous hypoxia on the brain. For the same threshold values in the tissue, threshold values of venous pO₂ are lower in venous hypoxia than in the case of arterial hypoxia. Changes in the diffusion conditions resulting from the two forms of hypoxia occur in different ways. Author

N72-32109*# Kanner (Leo) Associates, Redwood City, Calif.
EFFECT OF FLYING ON FIBRINOLYTIC ACTIVITY IN THE BLOOD OF JET PILOTS
 E. Kuhnke Washington NASA Mar. 1972 17 p refs Transl. into ENGLISH from Wehrdienst und gesundheit., v. 16, 1968 p 1-9 Sponsored by NASA
 (NASA-TT-F-14455) Avail: NTIS HC \$3.00 CSCL 06S

The effect of stress on fibrinolysis was investigated in pilots being trained in the Starfighter. The physical stresses due to accelerations and emotional stresses during flight are discussed along with the test methods. An average initial value of 192.3 minutes was found for the euglobulin-lysis time, and the average drop was 44 to 56% for the entire flight program. This signifies an important intensification of fibrinolytic activity, as the clot durability is reduced by half. It is recommended that fibrinolysis inhibitors be included with blood supplies for aircraft accidents. F.O.S.

N72-32110*# National Aeronautics and Space Administration, Washington, D.C.
INFLUENCE OF MEDIATION AND THE PRESENCE OF AN OBSERVER ON THE NUMBER OF AGREEMENTS REACHED IN NEGOTIATION
 Didier Vandenhove Jun. 1972 46 p refs Transl. into ENGLISH from Bull. Centre d'Etudes Rech. Psychotech., v. 19, 1970 p 131-153 Supported in part by Ind.-Univ. Found., by Louvain Univ. Center for Advan. Studies in Business Admin., and by Purdue Univ.
 (Grant NSF GS-999)
 (NASA-TT-F-14482) Avail: NTIS HC \$4.50 CSCL 05A

The effects of three modes of negotiation on the performance of two groups of subjects with different levels of cognitive complexity were studied in a laboratory setting during six consecutive negotiating sessions. The three modes were bilateral, with mediation, and in the presence of an observer. The subjects were observed in two situations varying in the number and quality of logically possible agreement alternatives, or contract zones. With bilateral negotiation, the cognitively complex subjects have better performances than the cognitively simple subjects in the most difficult situation, but they are not as good in the simplest situation. The effect of mediation is weak, slightly improving the performances of the simple subjects. The presence of an observer produces a sharp deterioration in the performances, most pronounced with the complex subjects in the most favorable situation. Overall, it seems that the three negotiating conditions affect the cognitively simple subjects in a more uniform and unequivocal manner than the cognitively complex subjects. Author

N72-32111*# National Aeronautics and Space Administration, Washington, D.C.
WATER-SOLUBLE FILTERS AND THEIR USE IN BACTERI-

AL COUNTS

K.-H. Maier and K. Voggel Jun. 1972 18 p refs Transl. into ENGLISH from Glas-Instr.-Tech., Fachz. Lab. (Darmstadt, West Ger.), Mar. 1965 p 119-126

(NASA-TT-F-14440) Avail: NTIS HC \$3.00 CSCL 06M

A water soluble material suitable for use in making filters to count bacteria suspended in the atmosphere is described.

Author

N72-32112*# National Aeronautics and Space Administration, Washington, D.C.

STUDIES OF BACTERIOLOGICAL BIOLUMINESCENCE. ACTION OF MAGNESIUM SALT

Giuseppe Zirpolo Jun. 1972 13 p refs Transl. into ENGLISH from Boll. Soc. di Naturalist (Italy), v. 33, 1920 p 112-119

(NASA-TT-F-14431) Avail: NTIS HC \$3.00 CSCL 06M

The action of magnesium sulfates and various other magnesium salts on phosphorescent bacteria is investigated. Attempts were made to determine what proportion of each salt would cause the greatest activity, intensity, and the duration of luminosity. The following results were reported: (1) All magnesium salts with the exception of salicylate caused extraordinary luminous intensity and duration in the bacteria. (2) Magnesium citrate had the least effect on luminescence. (3) Photogenic bacteria thrive in various magnesium salt solutions, but live longer in concentrations up to 11 percent. (4) Magnesium tartrate is most favorable to the development and duration of light in the photogenic bacteria.

E.H.W.

N72-32113*# Scientific Translation Service, Santa Barbara, Calif.

PHONOCARDIOGRAM ANALYSIS AND ELECTRONIC COMPUTERS

S. Yoshimura, J. Ozawa, E. Shimoji, A. Zeneomon, T. Suzuki, and T. Nagao Washington NASA Oct. 1972 19 p refs Transl. into ENGLISH from Naika No Ryoiki (Tokyo), v. 20, no. 1, Jul. 1967 p 65-72

(Contract NASw-2035)

(NASA-TT-F-14608) Avail: NTIS HC \$3.00 CSCL 06E

A current task in phonocardiography is to develop methods of quantitative analysis so that data can be indicated objectively. Attempts are being made to introduce electronic computers into this field. A hybrid computer system has been in phonocardiogram analysis since 1964. Concrete examples of measurements of 78 phonocardiograms by this system are described, and it is shown that there is good coincidence in 98.9% of the cases analyzed.

Author

N72-32114*# Scientific Translation Service, Santa Barbara, Calif.

COMPUTER ANALYSIS OF PHONOCARDIOGRAMS

S. Yoshimura, J. Ozawa, E. Shimoji, Z. Abe, T. Suzuki, and T. Nagao Washington NASA Oct. 1972 19 p refs Transl. into ENGLISH from Saishin Igaku (Japan), v. 22, no. 4, Apr. 1967 p 788-795

(Contract NASw-2035)

(NASA-TT-F-14588) Avail: NTIS HC \$3.00 CSCL 06E

Using a hybrid system of computer analysis of phonocardiograms, an attempt was made to diagnose on the level of the clinician of today. The equipment is described, and the measurement and pattern recognition processes are explained. The phonocardiograms of normal individuals and persons suffering from various heart diseases were analyzed by this method. As yet no definite conclusions were reached, although there are fairly good prospects of attaining the goal of perfecting diagnostic equipment on the clinician's level.

Author

N72-32115*# McDonnell-Douglas Astronautics Co., Huntington Beach, Calif. Biotechnology and Power Dept.

ANALYSIS OF FUNGAL TYPE ISOLATES TAKEN FROM A

90-DAY MANNED TEST OF AN ADVANCED REGENERATIVE LIFE SUPPORT SYSTEM

M. Sofios and F. E. Swatek (Calif. State Coll., Long Beach) Feb. 1972 35 p

(Contract NAS1-10717)

(NASA-CR-112018; MDC-G2826) Avail: NTIS HC \$3.75 CSCL 06M

Fungal-like cultures isolated before, during, and after the 90-day test from samples of space station simulator (SSS) atmosphere, surfaces, subsystem components, and crew thermal sites were identified to genus. Out of the original 525 isolates, approximately 80% were classified as bacteria. Laboratory methods (culture media, moisturization, and incubation temperatures) favored the recovery of medically significant bacteria rather than fungi. Therefore, fungal isolates were mostly, nonfastidious types which are ubiquitous in soil and air and commonly contaminate laboratory cultures of pathogens. Predominant isolates were species of *Aspergillus*, *Penicillium*, *Pullularia*, *Rhodotorula*, and various yeasts. No instances of fungal proliferation were observed; test data reflect the survival of environmental types indigenous to the SSS pretests.

Author

N72-32116*# Translation Consultants, Ltd., Arlington, Va.

DANGERS OF BED REST

J. Schouten and J. Th. R. Schreuder Washington NASA Aug. 1972 13 p refs Transl. into ENGLISH from Ned. Tijdschr. Geneesk. (Haarlem), v. 112, no. 29, Jul. 1968 p 1337-1341

(Contract NASw-2038)

(NASA-TT-F-14349) Avail: NTIS HC \$3.00 CSCL 06P

The hazards of bed rest as a therapeutic measure are described with respect to circulatory, respiratory and urogenital tracts. Effects on musculature, joints, skeleton and skin are discussed.

Author

N72-32117*# Boeing Co., Seattle, Wash. Aerospace Group.
EVALUATION OF PLASMA CLEANING AND ELECTRON SPECTROSCOPY FOR REDUCTION OF ORGANIC CONTAMINATION Final Report

May 1972 20 p refs Sponsored by NASA Prepared for JPL (Contract JPL Order GU-561461)

(NASA-CR-128302) Avail: NTIS HC \$3.00 CSCL 06M

The use of Auger spectroscopy to evaluate the effectiveness of plasma cleaning procedures in decontaminating Viking spacecraft is examined. Also investigated was the use of Auger spectroscopy to monitor organic contamination. Results show plasma cleaning can be used effectively to remove organic films and that Auger spectroscopy can be used to monitor organic contamination.

E.H.W.

N72-32118*# Kanner (Leo) Associates, Redwood City, Calif.
STUDIES ON THE pH-DEPENDENCE, INHIBITION, AND REACTIVATION OF ANGIOTENSIN 2 AND ANGIOTENSIN 2 AMIDE CLEAVING ENZYMES OF HUMAN PLASMA

M. Zwanzig and W. Oelkers Washington NASA Mar. 1972 17 p refs Transl. into ENGLISH from Z. Klin. Chem. Klin. Biochem. (West Germany), v. 7, 1969 p 253-258 Sponsored by NASA

(NASA-TT-F-14457) Avail: NTIS HC \$3.00 CSCL 06P

The pH-dependence of the biological inactivation of alpha-L-aspartyl-angiotensin 2 (A) and of alpha-L-asparaginyl-angiotensin 2 (H) in human plasma was compared. In addition, the pH-dependence of the EDTA inhibition of angiotensinases and its reactivations by divalent metal ions were investigated. Both substrates are cleaved by at least three enzymes with different pH optima. Distinguishable characteristics of the A- and H-inactivating enzymes were found in all pH ranges. Also compared was the pH-dependence of the biological inactivation of H and the cleavage of asparagine from H (aminopeptidase). The results are compatible with the assumption that the enzymes most active at pH 5.6 are endopeptidases and that the enzymes most active in the neutral and alkaline domains are aminopeptidases.

Author

N72-32119# Army Aeromedical Research Lab., Fort Rucker, Ala.

THE NEUROLOGICAL EFFECTS OF INH

J. E. Jordan, Stephen Shields, and Dan Bochner Dec. 1971 121 p refs

(DA Proj. 3AO-62110-A-819)

(AD-744808; USAARL-71-22) Avail: NTIS HC \$8.25 CSCL 06/5

Isoniazid (INH) was given for one year to a group of 28 volunteer civilian aviators. Neurological examinations, mental status examinations, EEG's and visual evoked potentials were monitored at control, six months and twelve months. Minor changes were observed in all the measures; none of these changes were severe enough to be of great concern. No evidence was found to justify restriction of flying during INH administration, although the results of this study suggest that careful monitoring of patients taking INH is indicated. Author

N72-32120# Army Aeromedical Research Lab., Fort Rucker, Ala.

EFFECT OF ISONIAZID ON PERFORMANCE 2

Mark A. Hofmann and Richard O. Nossaman Jun. 1971 33 p refs

(DA Proj. 3AO-62110-A-819)

(AD-728823; USAARL-71-23) Avail: NTIS HC \$3.75 CSCL 06/5

Seventeen aviators who converted from negative to positive on a tuberculosis time test performed a variety of laboratory tests given before, during, and after INH therapy. The INH was administered prophylactically at dosage levels of 300 mg. per day for one year. The tasks consisted of reaction time (auditory and visual), rotary pursuit tracking, mental multiplication and digit span. The data did not indicate that the drug adversely affected performance, on any of the tasks utilized. Author

N72-32121# Civil Aeromedical Inst., Oklahoma City, Okla.
SONIC BOOMS AND SLEEP: AFFECT CHANGE AS A FUNCTION OF AGE

Roger C. Smith and Gary L. Hutto Jun. 1972 14 p refs

(FAA-AM-72-24) Avail: NTIS HC \$3.00

Measurements were made of mood changes resulting from simulated sonic booms occurring during sleep. Subjects from three age groups (21 to 26, 40 to 45, and 60 to 72 years old) spent 21 consecutive nights in a sleeping room equipped for sonic boom simulation. During the sixth through seventeenth nights, simulated sonic booms of 1.0 psf outdoors overpressure level (.1 psf measured inside the sleeping rooms) were presented hourly throughout each night. As the measure of mood, the subjects completed a composite mood adjective checklist in the evening before retiring and in the morning after waking on each of the 21 days. No change in moods attributable to the occurrence of simulated sonic booms was found. Substantial effects relating to the age of subjects, irrespective of boom presentations, were obtained. It was concluded that simulated sonic booms of such low intensity were unlikely to have adverse consequences on the mood states of most individuals. Author

N72-32122# Australian Atomic Energy Commission, Coogee.
IN VITRO STUDY OF THE EFFECT OF GAMMA RAYS ON HUMAN CHROMOSOMES

C. Mouriquand, C. Gilly, C. Wolff, and J. Patet May 1971 17 p Transl. into ENGLISH from Intern. J. Radiation Biol. (London), v. 19, no. 3, 1971 p 263-279 (French Language Doc.) (LIB/Trans-366) Avail: AEC Depository Libraries

Blood was collected from seven human donors who had never been exposed to radiation. Samples were gamma-irradiated from a Co-60 source in doses of 25 to 500 rads and leukocytes were prepared for cytological examination. Observations on numerical anomalies of chromosomes included hypodiploidy,

hyperdiploidy, and tetraploidy. Structural anomalies included chromatid anomalies, chromosome anomalies, monocentric rearrangements, dicentrics, and fragments. The anomalies in chromosome number and structure are described in detail and relationships between radiation dose and chromosome anomalies are shown by means of graphs and tables. A discussion is presented of the present results in comparison to those reported in the literature. Author (NSA)

N72-32123# Battelle-Northwest, Richland, Wash.
IN-PHANTOM DOSIMETRY OF PROTOTYPIC PLUTONIUM CIRCULATORY SUPPORT HEAT SOURCES

F. T. Cross and J. C. Sheppard Feb. 1972 20 p refs Presented at the Symp. on Dosimetry Tech. Appl. to Agr., Ind., Biol., and Med., Vienna, 17 Apr. 1972

(Contract AT(45-1)-1830)

(BNWL-SA-4121; Conf-720411-3) Avail: NTIS

Tissue equivalent human phantoms were used to measure the radiation dose rate to adjacent tissues from a radioisotope heat source used to power blood circulatory support systems. A 30W Pu metal source containing about 900 Ci Pu-238 and 0.58 ppm Pu-236 was used in the heat source system. Photon dose rates were measured with small thermoluminescent dosimeters and neutron dose rates were measured with small tissue-equivalent proportional detectors. A computer code was used for computations of the radiation dose rate. Results indicated that the use of this mechanical heart over a long period of time would not exceed the radiation dose rates established as acceptable for occupational exposure. NSA

N72-32124# Army Foreign Science and Technology Center, Charlottesville, Va.

ESSAYS ON MARINE BIONICS

V. P. Sochivko 17 Apr. 1972 59 p Transl. into ENGLISH of the publ. "Ocherki Bioniki Morya" Leningrad, 1968

(AD-742638; FTD-HT-23-965-70) Avail: NTIS CSCL 06/4

The report consists of two chapters. A theoretical approach to duplicating biological systems of control with man-made devices is described in Chapter 5. The nature of conditioned and unconditioned reflexes in lower organisms is discussed, the possibility that some supposed reflexes even in fishes might really be evidence of mental activity being illustrated with examples. Pattern recognition in living organisms and attempts to duplicate them technologically are described in Chapter 6. Application of geometrical representations and statistical analysis to pattern recognition is discussed. The difficulty in selecting suitable parameters is emphasized. Author (GRA)

N72-32125# Human Factors Research, Inc., Goleta, Calif.

A STUDY OF RECOVERY FUNCTIONS IN MAN Technical Memo, 1 Mar. - 30 Nov. 1971

William Harris and James F. O'Hanlon Aberdeen Proving Ground, Md. Human Engineering Labs. Apr. 1972 91 p refs (Contract DAHC04-71-C-0015)

(AD-741828; HEL-TM-10-72) Avail: NTIS CSCL 06/19

Concepts of sustained and continuous military operations were examined with respect to relevant literature. In particular, the objectives were to predict behavioral and biological impairments which might result in those operations; and to determine whether the period necessary for recovery following a sustained operation can be ascertained from the literature. It was concluded that those objectives could not be met due to inadequate information. Nonetheless, the literature did provide data which suggest that certain severe impairments may be experienced by soldiers engaging in sustained and continuous operations. It also provided guidelines for the design of studies to collect the required information. Finally, this review led to a call for serious reevaluation of the current concepts of continuous operations. Author (GRA)

N72-32126# Army Foreign Science and Technology Center, Charlottesville, Va.

MORPHOLOGICAL CHARACTERISTICS OF THE BIOLOGICAL ACTION PRODUCED BY MAGNETIC FIELDS

I. V. Toroptsev 28 Jan. 1972 20 p refs Transl. into ENGLISH from Arkh. Patol. (Moscow), v. 30, no. 3, 1968 p 3-12 (AD-742513; FSTC-HT-23-349-72) Avail: NTIS CSCL 06/18

The author presents a literature survey on the biological action of magnetic fields and the results of experimental-morphological investigations, carried out at his laboratory. As demonstrated, direct magnetic field, 7,000 oersted in intensity, and an indirect on (50 cycles per sec.), 200 oersted in intensity possessed a marked biological effect. In the mentioned physical conditions and an equal exposure (6 1/2 hours) the indirect field proved to be more active. Direct and indirect magnetic fields proved to induce disturbance of hemodynamics and lymph circulation. Histological investigations demonstrated a paretic dilatation of capillaries, edema of the lungs and of the testicles. Dynamic investigations pointed to normalization of morphological picture 30 days after the field action. The magnetic fields (direct and indirect) failed to depress the regeneration. Author (GRA)

N72-32127# Pennsylvania Univ., Philadelphia. School of Medicine.

HISTOPATHOLOGY OF ARGON LASER-INDUCED RETINAL LESIONS Final Report, 1 Aug. 1970 - 31 Jan. 1971

Myron Yanoff Apr. 1972 9 p refs

(Contract DADA17-70-C-0011)

(AD-741380; Rept-3) Avail: NTIS CSCL 06/5

Information was obtained on the biologic effects of the argon laser on the retina. In addition, the biological retinal effects of other lasers (ruby, gallium arsenide, neodymium and carbon dioxide) were carried out. The pigment epithelium was the most sensitive area of the retina exposed to threshold argon and ruby laser energies. The photoreceptor and outer nuclear layers were the next most sensitive retinal areas exposed to argon radiation. The inner layers of the retina seemed to be relatively unaffected by the argon laser at threshold energies, and all layers except the retinal pigment epithelium were relatively unaffected by the ruby laser at threshold energies.

Author (GRA)

N72-32128# School of Aerospace Medicine, Brooks AFB, Tex.
DEVICE FOR THE DETERMINATION OF THE STABILITY OF STANCE AND THE FINE ADJUSTMENTS TO BODY EQUILIBRIUM

A. B. Venediktov, Yu. V. Terekhov, and M. I. Tishchenko 1972 11 p refs Transl. into ENGLISH from Russian Language Article

(AD-741265; SAM-TT-R-1116-0472) Avail: NTIS CSCL 06/16

The stabilograph was used to study the stability of stance of a group of healthy subjects. Based on this study the following parameters were found to be most important: frequency of fluctuation of the center of gravity of the human body in the sagittal and frontal planes, mean amplitude of these fluctuations, mean maximum fluctuation amplitude, and the ratio of the mean fluctuation amplitude with the eyes closed to the mean amplitude with the eyes open. The obtained data represents the first steppingstone toward the utilization of the stabilographic technic in clinical practice.

Author (GRA)

N72-32129# Monitor Labs., Inc., Rockville, Md.

DEVELOPMENT OF DATA ACQUISITION FACILITIES AND DATA ANALYSIS SERVICES APPLICABLE TO EXPERIMENTAL HYPERBARIC PHYSIOLOGY Final Report

Paul E. Wilkins 10 Apr. 1972 8 p

(Contract N00014-71-C-0026)

(AD-744053) Avail: NTIS CSCL 06/19

Facilities for data acquisition and analysis were expanded and improved at the Bethesda, Md. Naval Medical Research Institute. These facilities are used as a research tool in studies

of the hyperbaric physiology of human and animal subjects.

Author (GRA)

N72-32130# Human Engineering Labs., Aberdeen Proving Ground, Md.

ANALYSIS OF PILOT'S EYE MOVEMENTS DURING HELICOPTER FLIGHT

John A. Barnes Apr. 1972 137 p refs

(AD-742276; HEL-TM-11-72) Avail: NTIS CSCL 05/10

Eye movement data from the 21 maneuvers flown during the tactical utility helicopter information transfer study were analyzed to determine the scanning patterns, link value, dwell times and dwell fractions. These data and data from the major eye movement studies conducted since 1944 are presented in the same numerical format. The dwell fractions and mean dwell times for similar maneuvers are compared and the link diagrams for these maneuvers are given when the data was available. The aircraft which were flown or simulated in these studies include the U.S. Navy NH-1 (Howard DGA-15), PBV-5-A, and A-4; the U.S. Air Force C-45, T-33, and F-102; the U.S. Army UH-1B; the Boeing 707, the McDonnell-Douglas DC-8, and the Lockheed L-188.

Author (GRA)

N72-32131# Naval Air Development Center, Warminster, Pa. Crew Systems Dept.

THE DYNAMIC ENVIRONMENT DURING EMERGENCY DESCENT OF HIGH ALTITUDE/MULTI-MACH TRANSPORT AIRCRAFT Interim Report

Harald J. VonBeckh and Siegfried J. Gerathewohl 30 Dec. 1971 26 p refs

(Contract DOT-FA71WA1-232)

(AD-741686; NADC-CS-7133) Avail: NTIS CSCL 06/19

During the post decompression emergency descent the occupants will be subjected to deceleration induced inertial loads in the direction of the flight path. According to the selected flight path the aircraft's attitude angle will fluctuate and may reach or exceed minus 10 degrees. The resultant G vector will therefore be increased and shifted forward, i.e. the resulting G-load will tend to displace the forward facing occupant forward-downwards. Experiments with chimpanzees have shown that the recovery from the decompression and subsequent hypoxic stress is faster for subjects in semi-supine position, as compared with those in seated position. It is suggested to simulate both, the atmospheric and dynamic events in centrifuge experiments, comparing the behavioral and physiological reactions of forward as well as aft facing subjects. The results could serve for a reassessment of the value of aft-facing versus forward-facing passenger seats.

Author (GRA)

N72-32132# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio.

A DIGITAL SIMULATION OF PSYCHOLOGICAL CORRELATES OF A MODEL OF THE HUMAN VISUAL SYSTEM M.S. Thesis

William O. Ragsdale Mar. 1972 66 p refs

(AD-742431; GE/EE/72-19) Avail: NTIS CSCL 05/10

The purpose of this investigation is to establish psychological correlates for a transform model of the human visual system and to determine the model's ability to exhibit Gestalt grouping principles and visual illusions. Psychological correlates were obtained by comparing human visual performance to the computer model's performance; the correlation factors were high. Patterns containing Gestalt grouping principles and various visual illusions were presented to the filtered transform model to determine its ability to exhibit them in reconstructed images after low-pass filtering. Reconstructed images clearly show these characteristics.

Author (GRA)

N72-32133# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

FUNCTION OF THE ORGAN OF EQUILIBRIUM AND

MOTION SICKNESS

K. L. Khilov 13 Mar. 1972 345 p refs Transl. into ENGLISH from the monograph "Funktsiya Organa Rabnovesiya Ibolezni Peredvizheniya" 1969 p 1-279
(AD-742409; FTD-HC-23-325-71) Avail: NTIS CSCL 06/19

Motion sickness, or as it used to be called, seasickness, can develop in passengers on any form of transportation when there is angular or linear acceleration which can adequately stimulate vestibular receptors. This sickness is most often observed and is most severe in air and sea travel by persons with heightened excitability of the vestibular analyzer. The monograph presents data on the role of higher sections of the central nervous system in the development of vestibular symptoms which are a form of motion sickness. The report also describes rigorous vestibular tests the author and co-workers developed. These tests are in the form of an otolithic reaction, a test with cumulative otolithic stimulation and study of vestibular sensitivity to Coriolis acceleration, e.e., tests modeling actual situations when traveling in the air. Author (GRA)

N72-32134# Walter E. Fernald State School, Waverly, Mass. Eunice Kennedy Shriver Center.

CONCURRENT SCHEDULE CONTROL OF HUMAN EYE MOVEMENT BEHAVIOR Final Report

Peter B. Rosenberger 1 Sep. 1971 17 p refs
(Contract DADA17-70-G-9317)

(AD-741397; Rept-1) Avail: NTIS CSCL 05/10

Operant conditioning techniques were applied to the study of how human looking behavior is controlled by what is seen. In a standard vigilance setting, gaze at three illuminable volt meters was monitored by a Mackworth television eye camera with automatic recording capability. Gaze at a given meter produce illumination of the meter, and signals (deflections of the needle on the meter) were programmed as intermittent consequences of this response. Looking behavior was thus placed under the control of concurrent variable ratio, DRL and fixed interval schedules in normal adult volunteers. The effects of 24-hour sleep deprivation on this schedule control were studied in a single subject. The results showed that deterioration in signal detection under conditions of fatigue was a reflection of a decreased rate of observing responses, rather than a decreased efficiency of signal detection per observing response. It was concluded that concurrent schedule control is an effective experimental tool for studying the effects of display and physiological variables on human eye movement behavior. Author (GRA)

N72-32135*# National Aeronautics and Space Administration. John F. Kennedy Space Center, Cocoa Beach, Fla.

OPERATION AND MAINTENANCE, FIRE RESCUE AIR-PACK. VOLUME 2: COMMUNICATIONS

1 Jun. 1972 43 p

(NASA-CR-68614; KSC-TM-626-Vol-2) Avail: NTIS HC \$4.25 CSCL 06K

The operation and maintenance procedures are described for the development model of the fire rescue air pack (FRAP) voice amplifier assembly, including the battery charger. Operational instructions include a general description of the assembly, specifications, and installation and operation. Maintenance instructions include theory of operation, preventive maintenance, repair, adjustment, and a parts list. The FRAP is intended to permit fire rescue personnel to enter a smoke-filled, toxic or oxygen depleted environment carrying their own source of breathing air. The voice amplifier assembly permits the wearer to communicate by voice with other persons in the vicinity. The battery charger assembly provides a means of keeping the amplifier batteries fully charged. Author

N72-32136# Royal Aircraft Establishment, Farnborough (England).

ERGONOMICS AND ITS IMPORTANCE IN THE DEVELOPMENT OF FIGHTING VEHICLES

H. Schroetter Aug. 1972 17 p refs Transl. into ENGLISH from Truppenpraxis, no. 1, 1972 p 28-32
(RAE-Lib-Trans-1658; BR-31115) Avail: NTIS HC \$3.00

The psychophysical, and mechanical aspects of man's adaptability to the military technological environment are discussed in terms of arranging the tasks in a fighting vehicle to the capabilities of the soldier. The driver's compartment in a fighting vehicle was chosen for consideration. The following items are discussed: body dimensions, seat design, pedals, steering, levers, instruments, switches, and fighting space. F.O.S.

N72-32137# Michigan Univ., Ann Arbor. Electronic Systems Lab.

SIMULATOR EVALUATION OF PILOT ASSURANCE DERIVED FROM AN AIRBORNE TRAFFIC SITUATION DISPLAY Final Project Report, 1 Jul. - 31 Feb. 1971

Jack D. Howell Feb. 1972 165 p refs

(Contracts DOT-FA71WAI-234; F19628-70-C-0230)

(FAA-EM-72-3) Avail: NTIS HC \$10.25

Tests were run on a transport cockpit simulation facility to evaluate the pilot assurance value of airborne displays used as traffic situation monitors in high-density terminal airspace. The twenty professional pilots employed as subjects were exposed to a set of typical normal and abnormal terminal approach situations. Their level of assurance was determined from their detailed knowledge of each situation, measured by stop-action quizzes, and the ability to detect conflicts. Work-load or the degree of difficulty the pilots experienced in acquiring relevant information about the situation was also regarded as a component of assurance. Specific problem areas emphasized in the test scenarios were simultaneous approaches to closely-spaced parallel runways, blunder detection and resolution, and providing a picture for the pilot when discrete address data links replace current ATC party-line communications. As defined above, pilot assurance was found to increase markedly when a traffic situation display was available. Author

N72-32138*# Spacelabs, Inc., Chatsworth, Calif.

BIOMEDICAL GROUND LEAD SYSTEM Final Report

22 Aug. 1972 27 p

(Contract NAS9-11442)

(NASA-CR-128536; SR-72-1080) Avail: NTIS HC \$3.50 CSCL 06B

The design and verification tests for the biomedical ground lead system of Apollo biomedical monitors are presented. Major efforts were made to provide a low impedance path to ground, reduce noise and artifact of ECG signals, and limit the current flowing in the ground electrode of the system. E.H.W.

N72-32139*# Scientific Translation Service, Santa Barbara, Calif.

THE CONQUEST OF OUTER SPACE

T. Gualtierotti Washington NASA Oct. 1972 13 p Transl. into ENGLISH from the Italian document La Conquista dello Spazio Esterno, 1972

(Contract NASw-2035)

(NASA-TT-F-14535) Avail: NTIS HC \$3.00 CSCL 05E

The particular sensations associated with space flight, as well as changes in body functions and blood composition are discussed. The OFO-A experiment is described in detail. Author

N72-32140# Argonne National Lab., Ill.

RADIOLOGICAL PHYSICS DIVISION ANNUAL REPORT, JULY 1970 - JUNE 1971

Jun. 1971 325 p refs

(Contract W-31-109-eng-38)

(ANL-7860-Pt-2) Avail: NTIS

Exposure data for radium patients is presented. Radiation dosage distribution and effects were considered. K.P.D.

N72-32141# Battelle-Northwest, Richland, Wash. Biology Dept.

COMPLETELY IMPLANTABLE THREE CHANNEL TEMPERATURE BIOTELEMETRY SYSTEM

J. R. Decker and M. F. Gillis [1971] 8 p refs Presented at the 9th Rocky Mountain Bioeng. Symp. and the 10th Biomed. Sci. Instr. Symp., Omaha, May 1972
(Contract AT(45-1)-1830)

(BNWL-SA-4231; Conf-720508-1) Avail: NTIS

A completely implantable three channel pulse modulated transmitter and corresponding external receiver were developed to telemeter, from free ranging animals, body temperature and internal temperatures of an intracorporeal radioisotope heat source cooled by flowing blood. Temperatures ranging from 4 to 80 C can be telemetered over a range of 4 meters. Life expectancy of the device exceeds 10 months with calibration accuracy maintained to within 0.2 deg C. Author (NSA)

N72-32142# Air Force Human Resources Lab., Williams AFB, Ariz. Flying Training Div.

USING A GROUND TRAINER IN A JOB SAMPLE APPROACH TO PREDICTING PILOT PERFORMANCE

Ronald A. Goebel, David R. Baum, and William V. Hagin Nov. 1971 26 p refs

(AF Proj. 1123)

(AD-741747; AFHRL-TR-71-50) Avail: NTIS CSCL 05/9

The report documents a novel application of the job sample approach to screening candidates for Air Force Undergraduate Pilot Training. The job sample approach consists of obtaining work samples during early training or simulating work situations prior to training and deriving measures of performance from either for use as predictors of future job success. Two specially instrumented and slightly modified Link GAT-1 trainers (General Aviation Trainer for single engine, propeller driven aircraft) were used to present incoming students with two types of tasks: tracking tasks and aircraft maneuvers. Several classes of data, (e.g., tracking measures, maneuver measures, GAT-1 instructor pilot grades, were generated. Criterion data were check ride grades. Three important findings emerged: The concept of job sampling for screening purposes appears to be valid and should be vigorously pursued; the T-41 continues to predict subsequent performance in jet pilot training; and the ground trainer is a useful vehicle for predicting pilot success and should be given further study to assess its proper role in jet pilot screening.

Author (GRA)

N72-32143# Michigan State Univ., East Lansing. Lansing Computer Inst. for Social Science Research.

CHOOSING AMONG ALTERNATIVE DISTRIBUTIONS OF REWARDS

Lawrence A. Messe 1971 27 p refs Submitted for Publication

(Contract F44620-69-C-0114)

(AD-741176; AFOSR-72-0983TR) Avail: NTIS CSCL 05/10

Men can live together because they develop norms, or rules of conduct, which guide their interpersonal relations. Such rules can only serve their purpose to the extent that members of the group are willing to conform to them. The present research indicates that the norm of fairness, manifested in role symmetry, has the power to affect behavior. Author (GRA)

N72-32144# Illinois Univ., Urbana. Biological Computer Lab.

ACCOMPLISHMENT SUMMARY 1971-1972 OF THE BIOLOGICAL COMPUTER LABORATORY Report for 1 Jun. 1971 - 31 May 1972

1 Jun. 1972 278 p refs

(Grant AF-AFOSR-1865-70; AF Proj. 9768)

(AD-744009; BCL-72.2; UIIU-ENG-72-2529;

AFOSR-72-1216TR) Avail: NTIS CSCL 06/4

Investigations into linguistic interactions and logic are summarized. The application of those and related concepts to

models of cognition, education, and information retrieval is discussed. An alternative to conventional retrieval systems is described. Formal studies in description and four-dimensional perception are proposed. Theoretical results in neurophysiology and program analysis are presented. To information theory is contributed a new measure of diversity. Experimental work in sampling techniques is advanced, and its application to medicine and speech synthesis described. Author (GRA)

N72-33072* National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

PROCESS FOR THE PREPARATION OF BRUSHITE CRYSTALS Patent

Bernard Rubin and James D. Childress, inventors (to NASA) Issued 25 Jul. 1972 2 p Filed 26 Jun. 1970

(NASA-Case-ERC-10338; US-Patent-3,679,360;

US-Patent-Appl-SN-50339; US-Patent-Class-23-109) Avail: US Patent Office CSCL 06E

A description is given of the preparation and a process by which a calcium phosphate salt may be deposited on the surface of a tooth. The calcium phosphate is prepared using a gel medium process and deposited through gel diffusion. The use of the salt in repairing and strengthening damaged or weak teeth is discussed. Official Gazette of the U.S. Patent Office

N72-33073*# California Univ., Berkeley. Lawrence Radiation Lab.

STUDY OF THE EFFECTS OF ULTRASONIC WAVES ON THE REPRODUCTIVE INTEGRITY OF MAMMALIAN CELLS CULTURED IN VITRO

Bambino Isidonio Martins Aug. 1971 112 p refs Sponsored in part by NASA

(Contract W-7405-eng-48)

(NASA-CR-128356; LBL-37) Avail: NTIS HC \$7.75 CSCL 06P

The effects of monochromatic ultrasonic waves of 0.1, 0.5, 1.0, 2.0 and, 3.3 MHz frequency on the colony-forming ability of mammalian cells (M3-1, V79, Chang's and T-1) cultured in vitro have been studied to determine the nature of the action of ultrasonic energy on biological systems at the cellular level. The combined effect of ultrasound and X-rays has also been studied. It is concluded: (1) Ultrasonic irradiation causes both lethal and sublethal damage. (2) There is a threshold dose rate for lethal effects. (3) The effectiveness of ultrasonic waves in causing cell death probably depends on the frequency and the amplitude of the waves for a given cell line, indicating a possible resonance phenomenon. Author

N72-33074*# National Aeronautics and Space Administration, Washington, D.C.

LYMPHOBLASTIC TRANSFORMATION IN VITRO OF BLOOD LYMPHOCYTES IN CONJUNCTION WITH THE STUDY OF REPEATED SPONTANEOUS ABORTIONS

D. Alcalay, J. Choukroun, and P. Morin Sep. 1972 4 p Transl. into ENGLISH from Gynecol. Obstet. (Paris), v. 70, no. 1, 1971 p 59-62

(NASA-TT-F-14602) Avail: NTIS HC \$3.00 CSCL 06E

Nonspecific placental extracts failed to induce hypersensitivity reactions in pregnant and nonpregnant women. The isolation and culturing of the lymphocytes were performed using the technique of Brandt. Author

N72-33075# Civil Aeromedical Inst., Oklahoma City, Okla. **BEHAVIORAL CHANGES FROM CHRONIC EXPOSURE TO PESTICIDES USED IN AERIAL APPLICATION: EFFECTS OF PHOSDRIN ON THE PERFORMANCE OF MONKEYS AND PIGEONS ON VARIABLE INTERVAL REINFORCEMENT SCHEDULES**

Mark F. Lewis, Henry W. Mertens, and Jo Ann Steen Aug. 1972 5 p refs

(FAA-AM-72-29) Avail: NTIS HC \$3.00

Effects are examined on performance of pigeons and squirrel monkeys of Phosdrin (mevinphos), a cholinesterase-inhibiting pesticide. Variable interval schedules of reinforcement were used with both food and water as rewards. A dose-related decrease in response rate was observed with all animals. Decrements in behavior were observed at doses below which external symptoms of Phosdrin poisoning occurred, indicating the need for further investigation of the behavioral actions of pesticides. Author

N72-33076* Exotech, Inc., Washington, D.C.
SCIENTIFIC AND TECHNICAL SERVICES FOR DEVELOPMENT OF PLANETARY QUARANTINE MEASURES FOR AUTOMATED SPACECRAFT Quarterly Progress Report, 1 Jul. - 30 Sep. 1972
Edward J. Bacon 15 Oct. 1972 16 p refs
(Contract NASw-2372)

(NASA-CR-128347; QPR-2) Avail: NTIS HC \$3.00 CSCL 06M
The progress is reported for all 13 tasks of the program to develop planetary quarantine measures. Results of analyses of the following are included: activities of the SSB, Viking sterilization cycle, Jovian parameters, and review of the Martian data. F.O.S.

N72-33077* Techtran Corp., Glen Burnie, Md.
TWO PATHWAYS FROM PYRUVATE TO ACETYL-COENZYME A IN YEAST
H. Holzer and H. W. Goedde Washington NASA Oct. 1972 23 p refs Transl. into ENGLISH from Biochem. Z. (West Germany), v. 329, 1957 p 175-191
(Contract NASw-2037)
(NASA-TT-F-13909) Avail: NTIS HC \$3.25 CSCL 06M

It is demonstrated that there are two pathways from pyruvate to acetyl coenzyme A in yeast cells. Maceration juice contains the enzymes required for the first pathway: pyruvate decarboxylase, acetaldehyde dehydrogenase and aceto-CoA-kinase, the coenzyme requirements being as follow: DPN or TPN, ATP and coenzyme A. The enzyme (or the enzyme complex) of the second pathway is present in the mitochondria. These particles lack all of the enzymes of the first pathway, while the mitochondrial pyruvate oxidase does not occur in maceration juice. The pyruvate oxidase from mitochondria behaves in the same way as the known animal and bacterial pyruvate oxidases, i.e., the enzyme requires DPN (not TPN), Mg, thiamine pyrophosphate, and coenzyme A (but no ATP) as cofactors. The preparation of soluble pyruvate oxidase from mitochondria is described. Author

N72-33078* Translation Consultants, Ltd., Arlington, Va.
PHYSIOLOGICAL EFFECTS OF HYPOKINESIA
S. Kozlowski Washington NASA Oct. 1972 24 p refs
Transl. into ENGLISH from Postepy Astronautyki (Poland), v. 7, no. 4, 1969 p 25-47
(Contract NASw-2038)
(NASA-TT-F-14563) Avail: NTIS HC \$3.25 CSCL 06S

A review of the literature and data concerning the physiological effects of bed rest is presented. Changes in the oxygen transport system and their contribution to diminishing physical working capacity after bed rest is discussed in detail. Possible mechanisms underlying the decrease in aerobic working capacity after bed rest are analyzed. Particular attention is given to changes in body fluid, volume and distribution. The changes in mineral metabolism and endocrine function also are taken into consideration. The importance of the effects of bed rest in space and clinical medicine is reviewed. Author

N72-33079* Techtran Corp., Glen Burnie, Md.
COMPOSITION OF BONE SUPPORT SUBSTANCE
R. Klement Washington NASA Oct. 1972 12 p refs Transl.

into ENGLISH from Z. Physiol. Chem. (West Berlin), v. 184, 1929 p 132-142

(Contract NASw-2037)
(NASA-TT-F-13916) Avail: NTIS HC \$3.00 CSCL 06P

Basic and acid equivalent distribution in beef and human bones were determined, with emphasis on the solubility of bone ash and possible composition of basic phosphate under living body conditions. Author

N72-33080* Becton, Dickinson and Co., Raleigh, N.C. Research Center.

INVESTIGATION OF METHODS FOR STERILIZATION OF POTTING COMPOUNDS AND MATED SURFACES Final Report, 1 Aug. 1969 - 31 Dec. 1971

J. J. Tullius, D. J. Daley, and G. B. Phillips 28 Aug. 1972 140 p refs
(Contract NAS8-24513)

(NASA-CR-128368) Avail: NTIS HC \$9.00 CSCL 06M

The feasibility of using formaldehyde-liberating synthetic resins or polymers for the sterilization of pottling compounds, mated and occluded areas, and spacecraft surfaces was demonstrated. The detailed study of interrelated parameters of formaldehyde gas sterilization revealed that efficient cycle conditions can be developed for the sterilization of spacecraft components. It was determined that certain parameters were more important than others in the development of cycles for specific applications. The use of formaldehyde gas for the sterilization of spacecraft components provides NASA with a highly efficient method which is inexpensive, reproducible, easily quantitated, materials compatible, operationally simple, generally non-hazardous and not thermally destructive. Author

N72-33081* National Aeronautics and Space Administration. Manned Spacecraft Center, Houston, Tex.
PULMONARY EDEMA AND PLASMA VOLUME CHANGES IN DYSBARISM M.S. Thesis - Texas Univ.
James Allen Joki Jul. 1972 80 p refs
(NASA-TM-X-58095; MSC-07277) Avail: NTIS HC \$6.00 CSCL 06S

Two groups of anesthetized, fasted pigs were utilized. One group of 13 animals (8.5 to 16.6 kilograms) was exposed to a high-pressure environment, and the other group of eight animals (6.9 to 20.0 kilograms) constituted the control group. The experimental group was subjected to an atmosphere of 90 percent nitrogen and 10 percent oxygen at a pressure of 50 psig for 30 minutes and then decompressed at a rate 10 psi/min. Plasma volumes, using both iodine-125-tagged-albumin and chromium-51-tagged-cell dilution techniques, were measured before, immediately after, and at 30 and 60 minutes after decompression. Aortic and right-ventricular systolic pressures were also recorded. At 60 minutes after decompression, blood samples were taken, the animals were sacrificed, and the water content of the lungs, kidneys, livers, and spleens was estimated by measuring tissue wet weight and dry weight. Protein extravasation and tissue blood volumes were determined by measuring the iodine-125-tagged-albumin and chromium-51-tagged-cell spaces in homo-genates of the organs under investigation. Author

N72-33082* Brussels Univ. (Belgium).
MEDICAL ATLAS OF RADIONUCLIDES USED IN MEDICINE, BIOLOGY, INDUSTRY, AND AGRICULTURE
S. Simon 1971 374 p refs IN FRENCH
(EUR-4606) Avail: AEC Depository Libraries; EUR FB 300

This atlas of radionuclides is intended for small and medium sized users of radioactive substances. For each of the chemical elements, grouped according to the Mendeleev classification, it supplies the documentation necessary for the use of their various radioisotopes currently employed, while guaranteeing adequate protection of workers. For each nuclide and for its various possible radioisotopes the atlas supplies the radiophysical characteristics, the biological behavior in man in relation to the

standard man, with details of the critical organs and modes of elimination, the protection measures, with details of radiotoxicity and the maximum doses prescribed in the Euratom Standards for radiological protection, together with methods of disposal of waste. For industrial doctors responsible for radiation protection the atlas provides documentation dealing with specific decontamination measures, together with methods of detection when these extend beyond the scope of conventional dosimetry.

Author (NSA)

N72-33083# Medizinische Hochschule Hannover (West Germany). Abteilung fuer Biometrie.

STUDY ON DATA PROCESSING APPLIED IN MEDICINE [STUDIE UEBER DIE ANWENDUNG DER DATENVERARBEITUNG IN DER MEDIZIN]

B. Schneider Bad Godesberg, West Ger. Bundesmin. fuer Bildung und Wiss. May 1972 116 p In GERMAN; ENGLISH summary Sponsored by Bundesmin. fuer Bildung und Wiss. (BMBW-FB-DV-72-03) Avail: NTIS; Zentralstelle fuer Atomkernenergie-dokumentation (ZAED), Leopoldshafen, West Ger., 2190 DM

Proposals concerned with a support of research, technological development, and demonstration projects which will produce an innovation and general application of data processing in the general health service are presented. The development of special periphery units, dedicated data processing systems, and integrated modular constructed information systems are found to be necessary.

Author (ESRO)

N72-33084# SysteMed Corp., Dayton, Ohio.

ACUTE TOXICITY IN RATS AND MICE RESULTING FROM EXPOSURE TO HCl GAS AND HCl AEROSOL FOR 5 AND 30 MINUTES Final Report

K. I. Darmer, Jr., E. R. Kinkead, and L. C. DiPasquale Wright-Patterson AFB, Ohio AMRL Apr. 1972 23 p refs (Contract F33615-70-C-1046; AF Proj. 6302) (AD-744829; W72001; AMRL-TR-72-21) Avail: NTIS CSCL 06/20

Rats and mice have been subjected to HCl vapor and HCl aerosol for periods of 5 and 30 minutes to determine the acute toxicity of HCl. To simulate as nearly as possible the exposure conditions at rocket engine test firing sites, HCl vapor was mixed with a saturated water droplet mist in a Longley exposure chamber to obtain HCl aerosol atmospheres. The results indicate that HCl vapor and HCl aerosol have comparable toxicity in rats and mice, respectively. The results of the present study were compared to those obtained in another study of HCl vapor toxicity in rabbits and guinea pigs, and it was found that HCl had the same degree of toxicity in mice, rabbits, and guinea pigs, while rats were considerably more tolerant to the effects of HCl.

Author (GRA)

N72-33085# Aerospace Medical Research Labs., Wright-Patterson AFB, Ohio.

NOISE AND SPEECH LEVELS ASSOCIATED WITH THE F-111 A PREP AREA Final Report, May - Nov. 1970

Henry C. Sommer and Justus F. Rose, Jr. May 1972 38 p refs (AD-744828; AMRL-TR-72-2) Avail: NTIS CSCL 20/1

The purpose of the study was to measure the ambient noise environment and speech reception levels associated with the F-111 A flight prep area at McClellan AFB, California; to measure noise attenuation characteristics of several ear protection devices contemplated for use in the ambient noise; and to determine maximum permissible human exposure durations based on these data. The results show that a H-133 (standard AF communication headset, microphone) in combination with a custom molded insert communication earplug would permit personnel to be exposed up to 8 hours continuously at the 70% and 85% engine power settings. These time limits decrease to 36 minutes per 8 hour day during afterburner zone 5. Even in the highest noise levels, communication capability was satisfactory with this earplug/headset combination.

Author (GRA)

N72-33086# Naval Underwater Systems Center, Newport, R.I. Space Technology Dept.

A COMPUTER SIMULATED MODEL OF VISUAL PROCESSING

Thomas V. McAndrew 30 May 1972 129 p refs

(NUSC Proj. A-752-04; ZFX112001)

(AD-744927; NUSC-4323) Avail: NTIS CSCL 06/4

The work performed concerns structural models since it proposes a neural structure to account for a wide range of behavior and shows that the psychophysical and physiological data are compatible with the proposed structure. The model casts some doubt on the validity of feature extractors which have assumed a high degree of specificity in cortical neurons, based on physiological data alone. In precortical layers the neural network is a logical extension of the Hartline-Ratliff model. A convergent overlapping structure of fiber bundles is proposed in the cortex. A theoretical discussion of the anticipated behavior is presented and two mathematical constraints on the model are discussed. The practical aspects of simulating the model are reviewed and the modeling techniques are described. The model was simulated on a general purpose computer using the FORTRAN V language. The experimental results show that the model exhibits the behavior of brightness compression, contour enhancement, circular receptive fields in precortical layers and straight-edged receptive fields in the cortex.

Author (GRA)

N72-33087# Syracuse Univ., N.Y. Lab. of Sensory Communication.

[PHYSIOLOGY OF THE LIMULUS EYE] Semiannual Research Report, 1 Nov. 1971 - 1 May 1972

1 May 1972 36 p refs

(Contract N00014-67-A-0378-0003; Grants NSF GB-8412; NS-03950-10; NS-03950-1050; OEY00667-01)

(AD-743502; LSC-16) Avail: NTIS CSCL 06/16

Contents: Physiology of the Limulus visual system; Development of an electronic auditory receptor model; Short-term adaptation and incremental response of auditory nerve units; Stapedius responses to pairs of tone bursts; Encoding of light intensity by single receptors in the unexcised Limulus eye; Estimation of the integration time-constant in auditory receptor units; Some effects of short-term adaptation on incremental responses of auditory neurons; On loudness as a function of tone duration.

GRA

N72-33088# Aerospace Medical Research Labs., Wright-Patterson AFB, Ohio.

INFRARED RADIOGRAPHY AND RELATED STUDIES: ANNOTATED BIBLIOGRAPHY

James H. Veghte Mar. 1972 72 p

(AD-741950; AMRL-TR-71-127) Avail: NTIS CSCL 06/5

The report contains a highly comprehensive annotated bibliography of infrared radiographic studies conducted up to 1970. With the exception of a limited number of papers listed in the appendix, all papers were personally reviewed by the author. The bibliography was prepared with the hope that it would be of assistance to a wide variety of investigators in the field of infrared radiography.

Author (GRA)

N72-33089# Naval Postgraduate School, Monterey, Calif.

PUPIL DIAMETER VARIATION IN A VISUAL INTERPRETATION TASK M.S. Thesis

Thomas Victor Burns Mar. 1972 38 p refs

(AD-743727) Avail: NTIS CSCL 05/10

An indirect measurement of mental effort in interpreting an aircraft instrument was made using changes in pupil diameter and the latency of dilation as measures. Significance was found in latency of dilation across levels of interpretation difficulty, while no significance was found for percent changes in pupil diameter. Results also showed a moving base-line pupil diameter for all subjects across trials suggesting arousal decrement for the first half of the experiment, with a lesser effect for the latter half of the experiment.

Author (GRA)

N72-33090# Rochester Univ., N.Y. Center for Visual Science.
VISUAL SENSITIVITY Technical Report, Jan. 1969 - Dec. 1971

John Lett Brown May 1972 79 p refs
(Contract N00014-67-A-0398-0007)
(AD-744325) Avail: NTIS CSCL 06/16

Sensitivity as the word is used in vision research applies to studies of minimum detectable quantities. The quantities are usually of light required for threshold detection or difference discrimination as influenced by the state of adaptation, the retinal locus, various parameters of the stimulus such as its size, its spatial character and other considerations. The spatial discrimination capability of the eye is perhaps the most important characteristic of the sense of vision. Spatial considerations have been largely with respect to projections within a frontal plane or in the image on the retina. The 1971 review of Spatial Vision has been concerned largely with the discrimination of objects in the visual world as these are distributed in depth. The authors of that review have suggested that relation of the psychophysical data of depth discrimination to the underlying physiological processes is an easier job at the present time than is the case for other aspects of spatial vision. The directness of the relation varies considerably, but many investigators are anxious to relate their findings in psychophysical experiments to the data of electrophysiology or vice versa. GRA

N72-33091# Army Medical Research Lab., Fort Knox, Ky.
COCHLEAR PATHOLOGY IN MONKEYS EXPOSED TO IMPULSE NOISE Progress Report

Valdemar M. Jordan (Case Western Reserve Univ.), Marilyn L. Pinheiro (Case Western Reserve Univ.), Kazuo Chiba (Case Western Reserve Univ.), Armando Jimenez (Case Western Reserve Univ.), and George A. Luz 6 Mar. 1972 31 p refs
(DA Proj. 3A0-61102-B-71-R)
(AD-745105; USAMRL-968) Avail: NTIS CSCL 06/5

The cochleae of ten rhesus macaque monkeys exposed to impulse noise were examined using the surface preparation technique. There was great variability in the severity and extent of damage observed. All inner ears suffered destruction of Corti organ and myelinated nerve fibers along the initial segment of the basilar membrane. Further damage, limited mainly to outer hair cells, peaked at 8 to 10 mm. Generally the third or outermost row of outer hair cells lost the highest percentage of cells. Transitions between normal and damaged areas were abrupt. Hensen's cells were split away from Deiters' cells in the lower basal turn in half the animals. Inner hair cells, myelinated nerve fibers, and reticular lamina were resistant to destruction except in the hook area. Author (GRA)

N72-33092# Naval Personnel and Training Research Lab., San Diego, Calif.

A SELECTIVE REVIEW OF LISTENING RESEARCH
N. H. VanMatre and J. H. Steinemann May 1972 35 p refs
(PF395220020134)
(AD-743946; STB-72-10) Avail: NTIS CSCL 05/10

The literature survey constitutes an initial research effort designed to identify those factors which appear to be critical in auditory comprehension and which may eventually be utilized in programs to enhance the listening abilities of Navy personnel. A review of recent research was needed to assess the new and changing concepts of listening which are now available. A broad survey of listening information sources was conducted, consisting mainly of an overview of the available research literature, correspondence and personal contacts with other research groups, and first-hand evaluation of existing listening programs, equipment, and tests. The findings from the literature were discussed under three topic areas including: Elements of listening, measurement of listening, and relationships of listening ability to other variables. Author (GRA)

N72-33093# Bureau of Radiological Health, Rockville, Md.
Div. of Biological Effects.
LOW AND VERY LOW DOSE INFLUENCES OF IONIZING

RADIATIONS ON CELLS AND ORGANISMS, INCLUDING MAN: A BIBLIOGRAPHY

Benjamin P. Sonnenblick Feb. 1972 327 p refs
(Contract PH-86-67-133)
(PB-209804; BRH/DBE-72-1; FDA-72-327) Avail: NTIS HC \$6.00 CSCL 06R

A bibliography of more than 3400 citations on low and very low level (respectively, below 50 or 10 roentgens, rads, or rems) ionizing radiation effects on biological systems is presented. It is divided in eleven categories, and the citations cover a period from the early 1950's to mid-1969. Author (GRA)

N72-33094# Case Western Reserve Univ., Cleveland, Ohio.
Dept. of Mathematics and Statistics.

SEQUENTIAL SEARCH OF AN OPTIMAL DOSAGE, 2
Benjamin H. Eichhorn 15 Jul. 1972 18 p refs
(Contract N00014-67-A-0404-0009; NR Proj. 042-276)
(AD-745326; TR-5) Avail: NTIS CSCL 06/5

Sequential search procedures are described for determining an optimal dosage in the following biomedical problem. People are subjected to a certain chemotherapeutic treatment and on the one hand it is desirable to give each individual the maximal possible dosage. On the other hand, high doses create considerable toxicity, and it is undesirable to cross a certain limit of allowable toxicity level. The optimal dosage is defined as the maximal dose for which the proportion of patients in the population whose toxicity level will not cross the allowable limit is gamma. In the present paper the author discusses non-Bayesian sequential search procedures for the optimal dosage, assuming a linear regression between toxicity and dosage, and normal conditional distribution of the toxicity level at each dose. Author (GRA)

N72-33095 National Lending Library for Science and Technology, Boston Spa (England).

LESIONS OF THE NERVOUS SYSTEM IN DECOMPRESSION SICKNESS

M. P. Elinskii 7 Jun. 1972 12 p refs Transl. into ENGLISH from Russian conf. proc. p 615-622 Presented at 13th Symp. on Psychiat. and Neuropathol., Leningrad, 1968
(NLL-DRIC-Trans-2790-(3623.66); NLL-BR-30161) Avail: Natl. Lending Library, Boston Spa, Engl.: 1 NLL photocopy coupon

The adverse effects of decompression sickness on human and animal (cats and rabbits) nervous systems were studied. Pathological investigations revealed the following: (1) circular cavities in the grey matter of the brain and spinal cord, (2) compressed cerebral matter, (3) traumatic necrosis of brain tissue, (4) wasting arterial and venous vessels, and (5) psychomotor decrement. E.H.W.

N72-33096* Technology, Inc., San Antonio, Tex.

MODIFICATION OF THE PHYSICAL PROPERTIES OF FREEZE-DRIED RICE Patent

Clayton S. Huber, inventor (to NASA) Issued 19 Sep. 1972 2 p Filed 28 Aug. 1970

Sponsored by NASA
(NASA-Case-MSC-13540-1; US-Patent-3,692,533;
US-Patent-Appl-SN-68023; US-Patent-Class-99-80PS) Avail:
US Patent Office CSCL 06H

A process for preparing dehydrated rice during which the rice is cooked in water to a gelatinized state is described. The grain includes about seventy-five percent moisture content. Then the granular rice is subjected to freezing and thawing for two or more cycles. Finally it is frozen and freeze dried to remove moisture. The dehydrated granular rice is quickly rehydrated by placing it in hot water. Official Gazette of the U.S. Patent Office

N72-33097# National Aeronautics and Space Administration, Manned Spacecraft Center, Houston, Tex.

POSTFLIGHT ANALYSIS OF THE APOLLO 14 CRYOGENIC OXYGEN SYSTEM

D. D. Rule Mar. 1972 104 p refs
(Contract NAS9-11576)
(NASA-TM-X-68616; D2-118405-1-Suppl-2; MSC-04112-Suppl-2) Avail: NTIS CSCL 06K

A postflight analysis of the Apollo 14 cryogenic oxygen system is presented. The subjects discussed are: (1) methods of analysis, (2) stratification and heat transfer, (3) flight analysis, (4) postflight analysis, and (5) determination of model parameters.

Author

N72-33098* National Aeronautics and Space Administration, Manned Spacecraft Center, Houston, Tex.
EXTRATERRESTRIAL CONSUMABLES PRODUCTION AND UTILIZATION

Alfred P. Sanders May 1972 98 p
(NASA-TM-X-58087; MSC-06816) Avail: NTIS HC \$7.00 CSCL 05E

Potential oxygen requirements for lunar-surface, lunar-orbit, and planetary missions are presented with emphasis on: (1) emergency survival of the crew, (2) provision of energy consumables for vehicles, and (3) nondependency on an earth supply of oxygen. Although many extraterrestrial resource processes are analytically feasible, this study has considered hydrogen and fluorine processing concepts to obtain oxygen or water (or both). The results are quite encouraging and are extrapolatable to other processes. Preliminary mission planning and sequencing analysis has enabled the programmatic evaluation of using lunar-derived oxygen relative to transportation cost as a function of vehicle delivery and operational capability. Author

N72-33099# Civil Aeromedical Inst., Oklahoma City, Okla.
THE USE OF SIMPLE INDICATORS FOR DETECTING POTENTIAL CORONARY HEART DISEASE SUSCEPTIBILITY IN THE THIRD CLASS AIRMAN POPULATION

Michael T. Lategola Jul. 1972 10 p refs
(FAA-AM-72-26) Avail: NTIS HC \$3.00

Analyses were made of several Framingham heart study indicators of coronary disease in 423,330 male third class airmen. The data were obtained from current aeromedical certification records in January 1971. The distributions of resting blood pressure (BP), resting heart rate (HR) and the 400 pathology code prevalence were compiled in age versus Framingham relative weight index (FRWI) tables. In accordance with the FHS, obesity was defined as a minimum FRWI of 120.0%. Substantiating earlier findings all parameters generally increased with age and obesity. These findings are directly relevant to the mass aeromedical screening, early detection, susceptibility reversal and preventive aspects of CHD. Author

N72-33100* National Aeronautics and Space Administration, Washington, D.C.

MECHANICS OF MACHINES, NO. 7/8

I. I. Artobolevskiy, ed. Oct. 1972 213 p refs Transl. into ENGLISH of the publ. "Mekhanika Mashin, Vypusk 7-8" Moscow, Nauka Press, 1967 150 p
(NASA-TT-F-14335) Avail: NTIS HC \$12.75 CSCL 06B

The principles for designing manipulators are discussed as complex bioengineering systems. The dynamics of reversible follow-up systems as elements of manipulator drives are analyzed along with the influence of discontinuities in the kinematic chain on control systems. Papers on the dynamics of machines are included.

N72-33101* National Aeronautics and Space Administration, Washington, D.C.

SOME PROBLEMS OF THE THEORY OF MANIPULATORS

A. Ye. Kobrinsky and Yu. A. Stepanenko *In its Mech. of Machines, No. 7/8* Oct. 1972 p 1-31 refs

CSCL 06B

Selected problems encountered in the theory of manipulators are reviewed and formulated. Special features of modern type manipulators discussed include: manual manipulators, manipulator maneuverability, dissipative properties of manipulators, bioelectric control systems, and manipulators with automatic controls.

F.O.S.

N72-33102* National Aeronautics and Space Administration, Washington, D.C.

INVESTIGATION OF THE DYNAMICS OF A MANIPULATOR'S WORKING ORGAN

V. S. Yastrebov *In its Mech. of Machines, No. 7/8* Oct. 1972 p 32-43 refs
CSCL 06B

The kinematic chain of a manipulator grasping device with seven degrees of freedom is analyzed. Lagrange equations are used to analyze the inertial loads which are considered to be functions of generalized coordinates.

F.O.S.

N72-33103* National Aeronautics and Space Administration, Washington, D.C.

SOME PRINCIPLES OF THE DESIGN OF REMOTELY CONTROLLED MASTER-SLAVE MANIPULATORS

A. Ye. Bor-Ramenskiy, V. S. Kuleshov, N. A. Lakota, and V. I. Lobachev *In its Mech. of Machines, No. 7/8* Oct. 1972 p 44-58 refs
CSCL 06B

The operating principles of remotely controlled master-slave manipulators are described, and control systems with passive and active force reflections are discussed. Topics discussed include: kinematics and dynamics of the movement of control and manipulation organs, manipulator control systems with slave follow-up systems, and reversible follow-up systems.

F.O.S.

N72-33104* National Aeronautics and Space Administration, Washington, D.C.

STRUCTURAL AND ANALYTICAL REPRESENTATION OF REVERSIBLE FOLLOW-UP SYSTEMS

V. S. Kuleshov and N. A. Lakota *In its Mech. of Machines, No. 7/8* Oct. 1972 p 59-71
24-05
CSCL 06B

Using differential equations written in Laplace transforms, the structural and analytical representation of a remote elastic transmission is derived, and used to construct a reversible follow-up system (RFUS). It is shown that operation of the RFUS requires that the control signal to the slave element on the operator side be equal to the control signal to the slave element on the load side.

F.O.S.

N72-33105* National Aeronautics and Space Administration, Washington, D.C.

SOME PECULIARITIES IN THE DESIGN OF REVERSIBLE FOLLOW UP SYSTEMS

B. A. Petrov and A. I. Batyukov *In its Mech. of Machines, No. 7/8* Oct. 1972 p 72-85

CSCL 06B

An analogy based on the similarities between mechanical forces (moments) and voltages in electrical circuits is studied in a four-terminal network. Connecting the load to the reversible follow-up system (RFUS) is considered the equivalent of connecting impedance across the output of an electrical circuit. Results of analyzing different RFUS using this method are in agreement with experimental data.

F.O.S.

N72-33106* National Aeronautics and Space Administration, Washington, D.C.

MANIPULATORS WITH PERMANENT MAGNETIC CLUTCHES

N. F. Kostin *In its Mech. of Machines*, No. 7/8 Oct. 1972
p 86-93 refs
CSCL 06B

The design of manipulators with permanent magnet clutches that meet safety requirements when handling toxic or dangerous materials is discussed. Two types of magnetic clutches are considered: those with end magnetic clutches, and those with cylindrical magnetic clutches. F.O.S.

N72-33107* National Aeronautics and Space Administration, Washington, D.C.

PRINCIPLES OF THE ARRANGEMENT OF UNIVERSAL MECHANICAL MASTER-SLAVE MANIPULATORS

M. M. Logunov *In its Mech. of Machines*, No. 7/8 Oct. 1972
p 94-103
CSCL 06B

The principles of the arrangement of manual mechanical master-slave manipulators with flexible couplings are discussed. The main parts of the manipulator are control, slave, horizontal tubes rigidly connecting these parts, and a support. The master-slave movements include: forward and backward, right and left, up and down, rotation relative to the vertical axis of the controlling and slave units, gripping, and rotating the grip. F.O.S.

N72-33108* National Aeronautics and Space Administration, Washington, D.C.

EXPERIMENTAL RESEARCH ON THE MOVEMENTS IN THE LARGE JOINTS OF ARM

Yu. I. Dolnikov *In its Mech. of Machines*, No. 7/8 Oct. 1972
p 104-115 refs
CSCL 05E

The 1964 work accomplished by the Central Scientific Research Institute of Prosthetics and Orthopedic Appliances in building a device, and developing procedures for recording the functioning of large joints in the human arm as it performs everyday chores is reported. Author

N72-33109* National Aeronautics and Space Administration, Washington, D.C.

EVALUATION BY THE OPERATOR OF THE GRIPPING FORCE WHEN CONTROLLING AN ARTIFICIAL HAND

A. Yu. Shneyder *In its Mech. of Machines*, No. 7/8 Oct. 1972
p 116-134 refs
CSCL 05H

Metering the gripping force exerted by the the tongs of a manipulator, or by the fingers of an artificial hand is reviewed. The devices considered are grouped as devices with feedback metering the gripping force exerted automatically; and devices with feedback such that the operator can take an active part in metering the gripping force. The relative errors in the regulation of gripping force by the fingers of an artificial hand with visual feedback, vibration feedback, and with the fingers of a healthy arm with visual feedback disconnected are summarized. F.O.S.

N72-33110* National Aeronautics and Space Administration, Washington, D.C.

THE ESTIMATION METHOD FOR INVESTIGATING THE MOVEMENT OF A MACHINE UNIT WITH ELASTIC LINKS

V. L. Veyts *In its Mech. of Machines*, No. 7/8 Oct. 1972
p 136-154 refs
CSCL 05H

The problem is reviewed of constructing systems of approximate and refined estimates for solving systems of equations of motion for machine units with electric drives, and elastic links. Methods are developed that provide a practical means for making accurate estimates of the dynamic characteristics of the system. F.O.S.

N72-33113* National Aeronautics and Space Administration, Washington, D.C.

PRINCIPLES OF THE CONTROL OF MACHINES AND LIVING ORGANISMS BY MEANS OF THE BIOPOTENTIALS OF THE MUSCLES

A. Moretskiy, Yu. Ekel, and K. Fidelyus *In its Mech. of Machines*, No. 7/8 Oct. 1972 p 181-194 refs

CSCL 06B

The principles involved in controlling machines and living organisms by the biopotential of muscles were studied to develop a model for duplicating any program transmitted to it by a living organism over wires or radio. Assuming that command signals can be transmitted for a given muscle by surface electrodes, a model is developed for the upper extremity. It is concluded that the results have practical application in medicine for stimulation of the extremity in cases of neurogenic injuries, in industry as biomechanical stimulators during mass production, and in sports during training to strengthen motor skills. F.O.S.

N72-33115*# Lockheed Missiles and Space Co., Sunnyvale, Calif. Biotechnology Organization.

DESIGN AND DEVELOPMENT OF A PROTOTYPE WET OXIDATION SYSTEM FOR THE RECLAMATION OF WATER AND THE DISPOSITION OF WASTE RESIDUES ONBOARD SPACE VEHICLES

R. B. Jagow 26 May 1972 146 p refs

(Contract NAS1-9183)

(NASA-CR-112151) Avail: NTIS HC \$9.50 CSCL 06I

Laboratory investigations to define optimum process conditions for oxidation of fecal/urine slurries were conducted in a one-liter batch reactor. The results of these tests formed the basis for the design, fabrication, and testing of an initial prototype system, including a 100-hour design verification test. Areas of further development were identified during this test. Development of a high pressure slurry pump, materials corrosion studies, oxygen supply trade studies, comparison of salt removal water recovery devices, ammonia removal investigation, development of a solids grinder, reactor design studies and bearing life tests, and development of shutoff valves and a back pressure regulator were undertaken. The development work has progressed to the point where a prototype system suitable for manned chamber testing can be fabricated and tested with a high degree of confidence of success. Author

N72-33119# California Univ., Livermore. Lawrence Livermore Lab.

LOW-LEVEL COUNTING WITH SOLID-STATE Ge(Li) DETECTORS

Paul L. Phelps 8 Feb. 1971 52 p refs Presented at the Symp. on the Role of Semiconductor Detectors in the Future of Nucl. Med., Chicago, 12-13 Feb. 1971 Submitted for publication Sponsored by AEC

(UCRL-73023; Conf-710204-5) Avail: NTIS

A review of the operation and characteristics of Ge(Li) gamma spectrometers for low-level counting is given. Resolution and photopeak efficiency, interference from background and Compton radiation, counter shield construction, X-ray fluorescence production, cryostat considerations and signal processing are briefly discussed. Low-level counting results are presented on the analysis of blood serum for Co-57, analysis of rabbit thyroid gland for I-131, analysis of air filter sample for fission product radioisotopes, and analysis of soil for radioisotopes. Also, anticoincidence shielded spectrometers are discussed.

Author (NSA)

N72-33120# Vanderbilt Univ., Nashville, Tenn.

AN EXPERIMENTAL COMPARISON OF SCINTILLATION AND SEMICONDUCTOR DETECTORS FOR ISOTOPE IMAGING AND COUNTING

A. B. Brill, J. A. Patton, and R. J. Baglan [1971] 31 p refs

Presented at 13th Scintillation and Semiconductor Counter Symp., Washington, D. C., 1-3 Mar. 1972 Submitted for publication

(Contract AT(40-1)-2401)

(ORO-2401-48; Conf-720306-7) Avail: NTIS

Progress in the development of Si(Li) and Ge(Li) detectors for use in clinical diagnostic studies is outlined. The potential medical applications discussed include activation analysis, radioassay, radioisotope scanning, X-ray fluorescent scanning, X-ray fluorescence analysis, and flow studies. NSA

N72-33121# Naval Air Development Center, Warminster, Pa. Aero-Electronic Technology Dept.

EYE-SAFE OPERATION OF ILLUMINATOR-AIDED IMAGING SYSTEMS

S. B. Campana 19 May 1972 17 p refs

(AD-744656; NADC-72041-AE) Avail: NTIS CSCL 18/6

Eye-safe levels recommended by the three services are given in terms of maximum permissible corneal irradiance. The effect of laser sources with large exit pupils on the eye-safety calculations is discussed. Formulas for determining safe operating conditions are given. Six examples of eye-safety computations are given using the figures provided.

Author (GRA)

N72-33122# Admiral Corp., Chicago, Ill.

MODIFICATIONS TO X-RAY MOTION MONITOR. LOW DOSAGE, WIDE-VARIABLE FIELD TELEVISION RADIO-GRAPH FOR BIODYNAMIC ANALYSIS Technical Report,

Jun. 1966 - Sep. 1968

Martin Kozj and Edmund B. Weis, Jr. May 1972 171 p refs

(Contract AF 33(615)-5084; AF Proj. 7231)

(AD-744863; A12301-68-004A; AMRL-TR-72-50) Avail: NTIS CSCL 06/2

The report describes the results of work performed on certain modifications to the Quantitative Motion Monitor System undertaken by Admiral Corporation under a modification addendum to the original contract for the System. These additional efforts resulted in development, design, and delivery to the Air Force of four peripheral subsystems: namely, (1) an X-Ray Detector by means of which the x-radiation during an experiment can be quantized, (2) a System Synchronizer permitting remote operation of other associated equipments (i.e. Motion Picture Camera, Video Tape Recorder, etc.), (3) an Image Enhancer to provide electronic edge enhancing of weak video image signals, and (4) an Automatic Beam Current Control subsystem for electronic control of the Image Orthicon tube; in addition, (5) a study was made of the methods by which the television portion of the system capability could be increased for experimentation by increasing its frequency response (information rate).

Author (GRA)

N72-33123# Matrix Research Co., San Mateo, Calif.

UH-1H JOB PERFORMANCE TESTS (VNAF) SERIES SR-1

1 Sep. 1971 42 p refs

(Contract F33615-70-C-1550; AF Proj. 1710)

(AD-745161) Avail: NTIS CSCL 05/9

The SR-1 test is one of a series of 10 advanced type job performance tests which were developed for an assessment of the effectiveness of the UH-1H (helicopter) job performance aids (JPA) in use by the Vietnamese Air Force (VNAF). It includes a test of ability to perform five servicing tasks in intermediate inspection and servicing, tasks in helicopter maintenance, an information sheet on experience and training of the technician, a specific inspection test of the oil filters, fuel strainers, and engine chip detector; a performance manual and guide, a performance evaluation sheet, and a test administration evaluation form.

GRA

N72-33124# Matrix Research Co., San Mateo, Calif.

UH-1H JOB PERFORMANCE TESTS (VNAF) SERIES RR-2

1 Sep. 1971 22 p

(Contract F33615-70-C-1550)

(AD-745160) Avail: NTIS CSCL 05/9

The RR-2 test is one of a series of 10 advanced type job performance tests which were developed for an assessment of the effectiveness of the UH-1H (helicopter) job performance aids (JPA) in use by the Vietnamese Air Force (VNAF). It includes a test of ability to remove and replace the main drive shaft of the helicopter, helicopter maintenance tasks, an information sheet on the technician's experience and training, a performance test of main drive shaft removal and replacement, a performance guide, a performance evaluation sheet, and a form for evaluating test conditions. GRA

N72-33125# Matrix Research Co., San Mateo, Calif.

UH-1H JOB PERFORMANCE TESTS (VNAF) SERIES RR-1

1 Sep. 1971 22 p

(Contract F33615-70-C-1550; AF Proj. 1710)

(AD-745159) Avail: NTIS CSCL 05/9

The RR-1 test is one of a series of 10 advanced type job performance tests which were developed for an assessment of the effectiveness of the UH-1H (helicopter) job performance aids (JPA) in use by the Vietnamese Air Force (VNAF). It includes an aptitude test for removing and replacing a helicopter intermediate gearbox, helicopter maintenance tasks, an information sheet on previous experience and training, a performance test on replacing a 42 degree gearbox, a performance guide and replacement instructions, a performance evaluation sheet, and a form for recording test administration conditions. GRA

N72-33126# State Dept., Washington, D.C.

DOCUMENTS FOR THE UN CONFERENCE ON THE HUMAN ENVIRONMENT, PART 3

Mar. 1972 148 p refs In ENGLISH and FRENCH Conf. held at Stockholm, 5-16 Jun. 1972 Revised

(PB-206618-3-1; A/Conf-48/12) Avail: NTIS HC \$3.00 CSCL 13B

The UN system and the human environment; and A/Conf.48/12Bibliography. GRA

N72-33127# Army Natick Labs., Mass.

A HUMAN FACTORS EVALUATION OF COLD WEATHER FACE MASKS

Carolyn K. Bense, Richard F. Q. Johnson, and Thomas L. Nichols Apr. 1972 84 p refs

(AD-745087; USA-NLABS-TR-72-73-PR) Avail: NTIS CSCL 05/5

A human factors evaluation of three types of cold weather face mask (the Army Standard and two experimental masks) was made in a series of investigations: A visual field investigation, a psychoacoustic investigation, a personal/equipment compatibility test and an arctic chamber test. Results indicated that (a) all three masks were virtually equivalent with respect to the size of the field of vision and person/equipment compatibility, (b) acceptability of the masks varied from a psychoacoustic point of view as a function of the particular variable being measured, and (c) under simulated arctic conditions, the experimental masks offered far better protection of the wearer's skin than did the standard mask. Author (GRA)

N72-33128# Matrix Research Co., San Mateo, Calif.

UH-1H JOB PERFORMANCE TESTS (VNAF) SERIES CO-1

1 Sep. 1971 19 p Partly in ENGLISH and partly in VIETNAMESE

(Contract F33615-70-C-1550; AF Proj. 1710)

(AD-745157) Avail: NTIS CSCL 05/9

The CO-1 test is one of a series of 10 advanced type job performance tests which were developed for an assessment of the effectiveness of the UH-1H (helicopter) job performance aids (JPA) in use by the Vietnamese Air Force (VNAF). It includes an aptitude test to determine a technician's ability to make an operational check of a tail rotor blade, procedures to insert faults to be corrected, helicopter maintenance tasks, an information sheet on experience and training of the technician, a tail rotor blade operational checking test, a performance evaluation sheet, and a sheet to record the conditions of test administration. GRA

N72-33129# Matrix Research Co., San Mateo, Calif.
UH-1H JOB PERFORMANCE TESTS (VNAF) SERIES AD-2
 1 Sep. 1971 26 p Partly in ENGLISH and partly in VIETNAMESE
 (Contract F33615-70-C-1550; AF Proj. 1710)
 (AD-745156) Avail: NTIS CSCL 05/9

The AD-2 test is one of a series of 10 advanced type job performance tests which were developed for an assessment of the effectiveness of the UH-1H (helicopter) job performance aids (JPA) in use by the Vietnamese Air Force (VNAF). It consists of testing a technician's ability to adjust a misadjusted RPM governor linkage, fault insertion procedures for engine cowlings, helicopter maintenance tasks, an information sheet on experience and training of the technician, RPM governor linkage adjustment tests, test of ability to follow a performance guide, a performance evaluation sheet, and data on test administration conditions.

GRA

N72-33130# Matrix Research Co., San Mateo, Calif.
UH-1H JOB PERFORMANCE TESTS (VNAF) SERIES AD-1
 1 Sep. 1971 19 p Partly in ENGLISH and partly in VIETNAMESE
 (Contract F33615-70-C-1550; AF Proj. 1710)
 (AD-745155) Avail: NTIS CSCL 05/9

A series of 10 advanced type job performance tests was developed for an assessment of the effectiveness of the UH-1H (helicopter) job performance aids (JPA) in use by the Vietnamese Air Force (VNAF). The 10 tests were used to evaluate the three types of JPA in use by the VNAF, namely job guidance manuals, maintenance dependency type troubleshooting aids, and fully proceduralized troubleshooting aids. Series AD-1 covers power cylinder servo value adjustment tests, helicopter maintenance tests, questionnaire on helicopter maintenance experience and training, flight control adjustment test, evaluation of technician's performance, and details of test conditions.

GRA

N72-33131# Matrix Research Co., San Mateo, Calif.
UH-1H JOB PERFORMANCE TESTS (VNAF) SERIES CO-2
 1 Sep. 1971 39 p
 (Contract F33615-70-C-1550; AF Proj. 1710)
 (AD-745158) Avail: NTIS CSCL 05/9

The CO-2 test is one of a series of 10 advanced type job performance tests which were developed for an assessment of the effectiveness of the UH-1H (helicopter) job performance aids (JPA) in use by the Vietnamese Air Force (VNAF). It includes an aptitude test for checking the operation of an aircraft lighting system, procedures for insertion of faults for correction, helicopter maintenance tasks, an information sheet on maintenance experience and training, operational tests of pitot tube heater, panel lights, and interior and exterior lights, a performance guide and operational checklist, a performance evaluation sheet, and a form for recording test administration conditions.

GRA

N72-33132# Matrix Research Co., San Mateo, Calif.
UH-1H JOB PERFORMANCE TESTS (VNAF) SERIES SR-2
 1 Sep. 1971 24 p
 (Contract F33615-70-C-1550; AF Proj. 1710)
 (AD-745162) Avail: NTIS CSCL 05/9

The SR-2 test is one of a series of 10 advanced type job performance tests which were developed for an assessment of the effectiveness of the UH-1H (helicopter) job performance aids (JPA) in use by the Vietnamese Air Force (VNAF). It includes an aptitude test of main drive shaft servicing, helicopter maintenance tasks, an information sheet on experience and training, a 600-hour servicing test of servicing the main drive shaft, a servicing performance guide, a performance evaluation sheet, and a form for recording test conditions. GRA

N72-33133# Batelle Columbus Labs., Ohio.
IMPROVEMENTS TO THE CONTROL BLOCK OF THE MARK 6 MOD 2 SCUBA Task Report, Apr. 1971 - Feb. 1972

Peter S. Riegel and J. S. Glasgow 30 Jun. 1972 22 p refs
 (Contract N00014-70-C-0072)
 (AD-744235; SUPDIVE-TR-3-72) Avail: NTIS CSCL 06/11

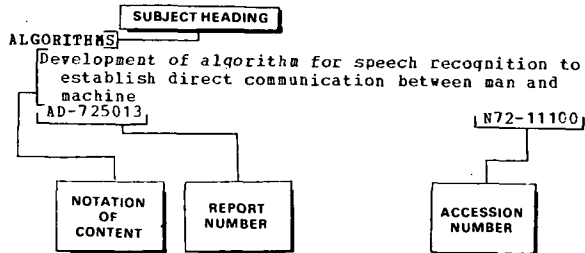
A program was conducted to improve certain deficiencies associated with the control block of the Mark VI Mod 2 SCUBA, a semiclosed-circuit rebreather. The areas to be improved included the bypass valve, the gas metering system, and the differential-pressure gauge. After computation of flows and laboratory testing of components and orifices was performed, a prototype embodying improvement in the problem areas was fabricated and delivered to the Navy.

Author (GRA)

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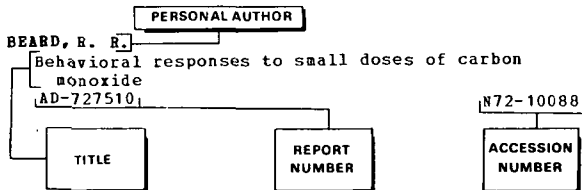
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